THE IRON AGE

THURSDAY, AUGUST 23, 1888.

Improved Diamond Prospecting Drills.

An improved form of diamond prospecting drill is now being put on the market by the American Diamond Rock Boring Company, 15 Cortlandt street, New York, the engravings in this impression illustrating its main features.

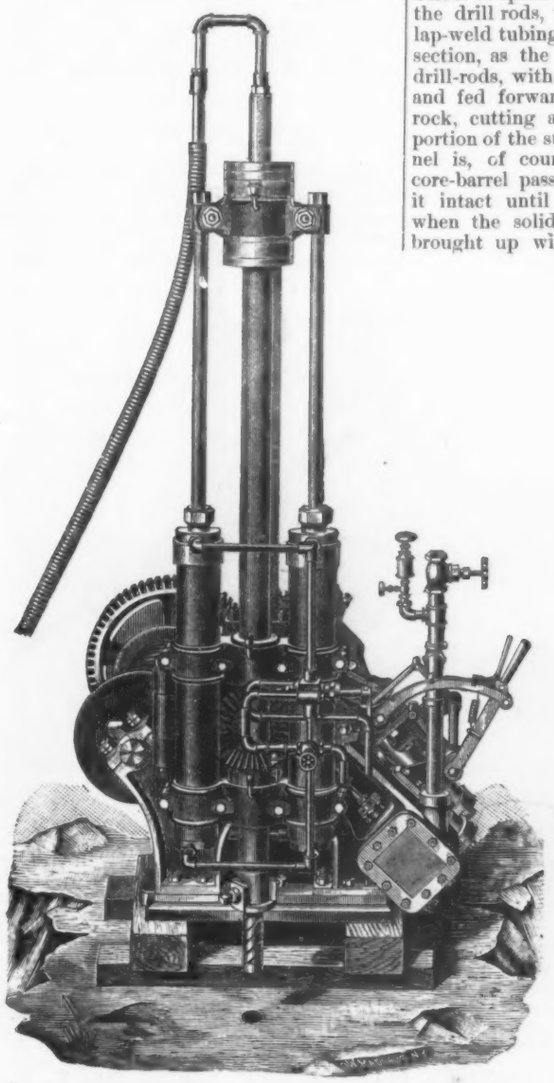


Fig. 1.—Front View.

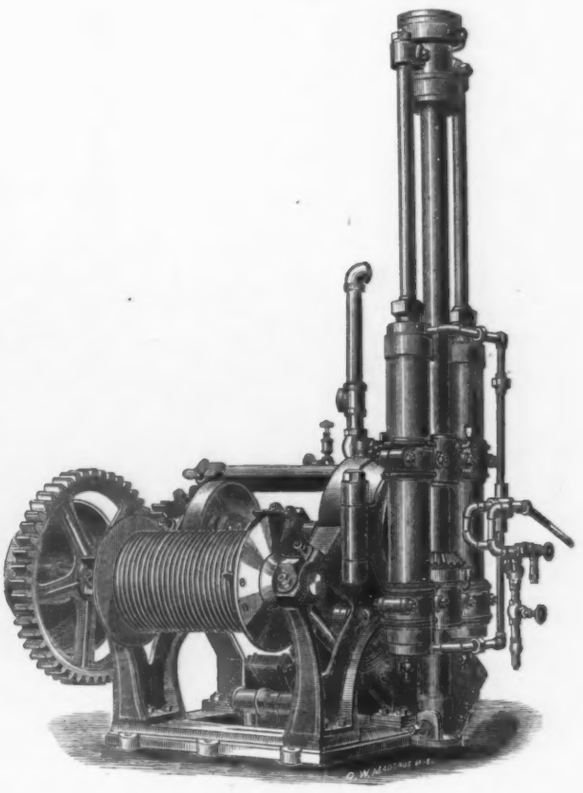


Fig. 2.—Side View.

IMPROVED DIAMOND PROSPECTING DRILL, BUILT BY THE AMERICAN DIAMOND ROCK BORING CO., N. Y.

It may not be without interest to explain here that the principle of the diamond drill lies, first, in the rapid rotation of a hollow "bit," of which the cutting edges are the diamonds, set up in such a manner that they are the only parts of the tool that come in contact with the rock; and second, in forcing a stream of water down through the interior of this bit, passing up outside of it and carrying away the material ground up by the diamonds. The hollow bit is a steel thimble, having three rows of diamonds (bort or carbon) embedded in it, so that the edges of those in one row project from its face, while the edges of those in the other two rows project from the outer and inner periphery respectively. The diamonds of the first-mentioned row cut the path of the drill in its forward progress, while those upon the outer and inner periphery of the tool enlarge the cavity around the same, and admit the free ingress and egress of the water. The bit is screwed to the core-barrel or spiral grooved guide, and this to the drill rods, which are made of heavy lap-weld tubing, and added, section after section, as the hole deepens. When the drill-rods, with bit attached, are rotated and fed forward, the bit passes into the rock, cutting an annular channel. That portion of the stone encircled by this channel is, of course, undisturbed, and the core-barrel passing down over this keeps it intact until the rods are withdrawn, when the solid cylinder thus formed is brought up with them, a "core-lifter" breaking it at the bottom of the hole and securely wedging it in the core-barrel.

At the upper end of the drill-rods is a water swivel, with connection with the steam pump. By means of this pump a constant stream of water is forced down through the hollow drill-rod, keeping the bit cool and the hole clear of sediment, which is forced by the water pressure up the outside of the rods to the surface. When a core is not required a solid bit may be used, the detritus being washed out by the water, as when boring with the annular bit. These general principles of boring with the diamond drill are always the same, the different machines, by comparatively slight changes, being applicable to any kind of rock drilling. For deep boring, for wells or for prospecting mineral lands we use a machine with double cylinder reversible engine, mounted either on bed-plate or an upright or horizontal tubular boiler. The capacity of the engine varies according to the depth and size of the hole which the drill is required to bore.

Fig. 1 represents a front view of what is known as the No. 3 drill. It is operated by regular reciprocating engines, with cross-head and steel connecting rods and simple reversing arrangement. The valve motion is on the regular plan for hoisting or locomotive engines. The driving gears are of composition metal, and the engines can be run at a very high rate of speed, without vibration. Hydraulic feed is employed, replacing the differential feed on the boiler machines. By this the feed motion is accomplished, as its name indicates, by hydraulic pressure, through the medium of two small cylinders and pistons, the piston rods being connected by a suitable cross-head to the plain hollow spindle, which carries the drill rod. Both ends of the hydraulic cylinders are connected by a system of pipes and hose to the pumps that supply the water necessary in drilling with the diamond bit. The quantity of water admitted to the cylinders is controlled by a four-way cock, which also admits water to either end of the cylinders, as the operator may require. Thus, it will be readily understood, the amount of pressure on the bit is directly under the control of the operator, and only limited by the water pressure from the supply pumps, the range being, in ordinary cases, from nothing up to 4000 pounds. The changes through the whole range of pressure, and also the reversing of the motion

of the feed, are accomplished by simply moving a small lever, while the machine is running at full speed. A pressure gauge is placed on the pipe leading to the hydraulic cylinders, so that the operator can at all times just see how much pressure there is on the bit. With any constant pressure this feed gives a very perfect automatic adjustment of the speed with which the drill is fed forward, the rate of progression depending upon the hardness of the material, being from frequently less than 1 inch per minute in very hard rock, to over 2 feet per minute in a soft substance like coal. This carries the additional advantage with it, that the operator, after some experience, can, by comparing the pressure shown by the gauge with the rate of penetration of the drill, tell about what kind of material the bit is boring through and can make use of the knowledge thus obtained, either for speed or for safety.

The swivel-head is hinged and so arranged that by simply loosening one bolt it can be opened and swung out of the way when withdrawing the drill rods from the bore hole or replacing them in it. This will be more clearly understood from Fig. 3. It can also be turned or "swiveled" so as to adjust the spindle for boring vertically, horizontally or at any desired angle. The large hoisting-drum is fitted for wire rope, and is capable of handling 1000 feet of drill rods with a single whip. A slip drum is attached to same shaft for use in driving casing.

The drill will bore vertically, horizontally or at any angle, to a depth of 1000 feet, taking out a core or sample of the rock penetrated. These samples are not disintegrated fragments of rock, but continuous solid cylinders, showing clearly the stratification and character of the mine or quarry at any depth. The No. 1 drill which the company build is the same as that just described, but is mounted on a carriage with a boiler outfit. The bit is 2 inches in diameter, and the core 1⅛ inches. The weight of the No. 3 machine is 1800 pounds, the heaviest piece weighing about 250 pounds.

In Fig. 4 we show an underground prospecting and mining drill, which will bore a 1½-inch hole 250 feet in any direction, taking out a 1-inch core. This drill can be run either by steam or compressed air, and is especially valuable in sinking shafts, driving tunnels, or in any possible position where any kind or style of drill can be used. In underground prospecting its lightness, combined with ease of management, makes it particularly valuable. A differential feed is employed. For this purpose the machine is fitted with a grooved screw-shaft, feathered to the lower sleeve gear. This is a double gear, connecting by its upper teeth with a beveled driving gear, and by its lower teeth with the release gear—a frictional gear at the bottom of the short feed-shaft. At the upper end of the feed-shaft another gear is feathered, connecting with an upper gear on the screw-shaft. This last gear is attached to the feed-nut, in the thread of which runs the screw of the screw-shaft, and, as the gear of the feed shaft has one or more teeth than that of the feed-nut, the nut makes fewer revolutions in a given time than the screw-shaft, thus producing the differential feed. The frictional gear on the bottom of the feed-shaft combines with this a frictional feed, making the drill sensitive to the character of the rock through which it is passing by maintaining a uniform pressure. The severe and sudden strain upon the cutting points incidental to drilling through soft into hard rock is thus avoided.

The tubular drill-rod passes through the screw-shaft, and is held firmly by a chuck, the motion of the screw-shaft being thus communicated to the drill-rods and bit. In order to run the screw-shaft back after it has been fed forward its full length, it is only necessary to release the chuck and to loosen the nut on the frictional gear, thus allowing the gear to run loose; then the screw-shaft will run up with the same motion which carried it down, but with a velocity 60 times greater. The chuck and nut are then tightened, giving the screw-shaft a grip on the drill-rod in a new place, and the drill is ready for another run. The drill-rods may be extended to any desired length by simply adding fresh pieces of tubing, the successive lengths being quickly coupled together. In order to secure compactness the driving cylinders are of the oscillating type. The drill is a convenient tool, and for many purposes will be found to be of great value.

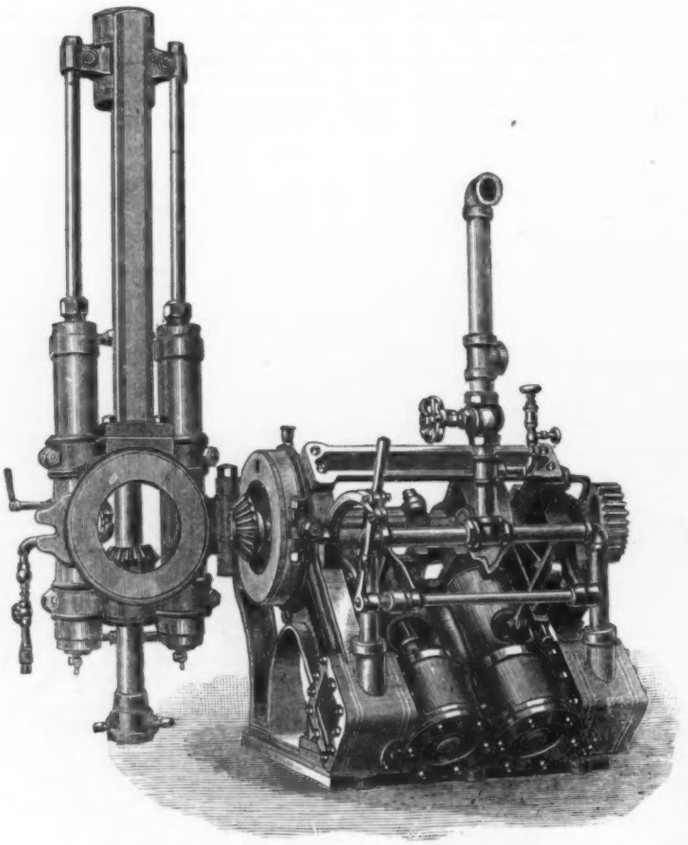


Fig. 3.—Drill with Hinged Swivel Head Open.

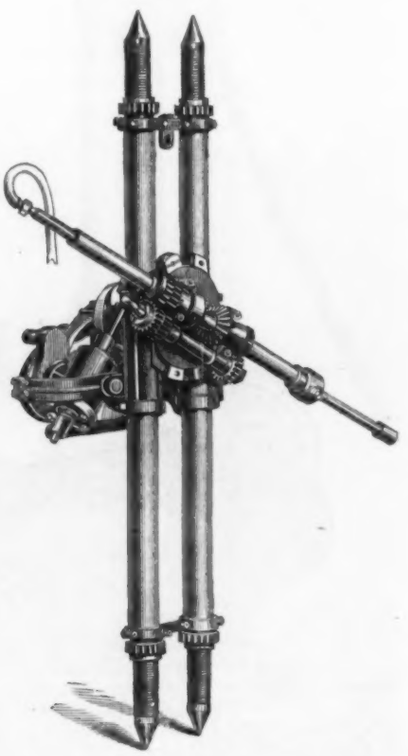


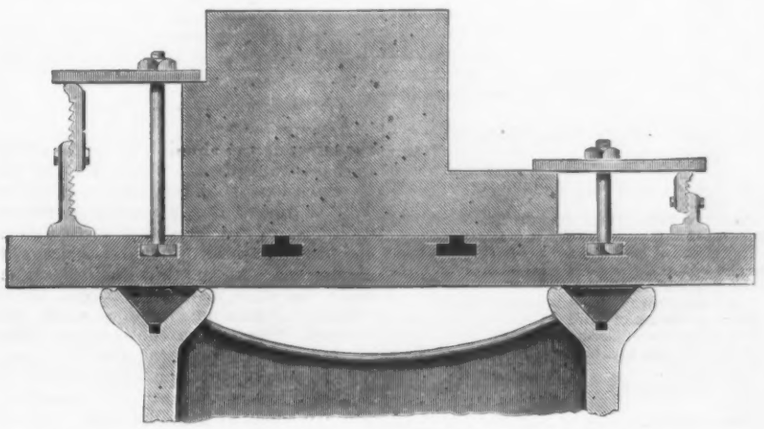
Fig. 4.—Underground Prospecting and Mining Drill.

IMPROVED DIAMOND PROSPECTING DRILL, BUILT BY THE AMERICAN DIAMOND ROCK BORING CO., N. Y.

The specific heat of air at constant pressure being 0.2377, the specific heat of water, which is 1, is therefore 4.1733 times greater under ordinary circumstances. A pound of water losing 1° of heat, or 1 thermal unit, will consequently raise the temperature of 4.17 pounds, or, at ordinary temperatures, say 50 cubic feet of air, 1°. A pound of steam at atmospheric pressure, having a temperature of 212° F., in condensing to water at 212° F., yields 965.7 thermal units, which, if utilized, would raise the temperature of 5 × 965.7 = 48,285 cubic feet of air 1°, or about 690 cubic feet from 0° to 70° F.

Adjustable Clamping Blocks.

The Energy Mfg. Company, 1115–1123 South Fifteenth street, Philadelphia, Pa., are bringing out a new clamping block for securing work on planers, shapers, drills, boring machines, &c. The engraving, which we annex, represents a section of a planer with the clamps holding a piece of work to the table. It will be noticed that instead of using wooden pieces and scrap, to fill under the outer ends of clamps, adjustable clamp blocks are used which have teeth and are bolted together. This prevents their giving, no matter how much strain is brought upon them by the clamp bolts. The blocks can be used in a number of places to advantage, and will save considerable time. They are made in four sizes.



ADJUSTABLE CLAMPING BLOCKS, MADE BY THE ENERGY MFG. CO., PHILADELPHIA, PA.

Cost of Importing Tin Plate.

Some time ago a correspondent suggested to us the advisability of publishing in our columns a set of rules, with tables and other data, for figuring from the English quotations the cost in American currency of tin plates laid down in this country, allowances being made for all ordinary charges, such as commissions freights, &c. At first sight this appears to be a very simple problem, but a little investigation will soon discover its difficulties. Many a large consumer of tin plates, in the hope of saving money, has attempted to import his plates direct, but we do not know of a single instance where the experiment has proved a success, or, if fortunate enough to obtain his plates at prices a little under the jobbers' quotations, the troubles, delays and vexations experienced have far more than outweighed the little money gain, and rarely if ever has the consumer been tempted a second time to import direct. Notwithstanding the impracticability of the tin-plate consumer buying abroad, it may be of interest to describe, in a general way, the method of figuring the cost of plates laid down, in New York for instance. A rough rule for the purpose is to figure the shilling at 25 cents, which is a little in excess of its actual value, the difference (2 to 3 per cent.) covering the foreign charges. Having thus reduced the English quotation in shillings and pence to American currency, the freight, insurance and duty are then added and the sum will be the approximate cost of the plates delivered here. Or, to be more exact, take the quotation f.o.b. Liverpool, deduct 4 per cent. for cash, then reduce this net price to currency according to the quotation for sight exchange. To this add 3 per cent. to cover the insurance, consular charges, &c., and the sum will be the cost of the plates on ship at Liverpool. The next item to take into account is the ocean freight, which is of course a variable factor depending upon the current rates, and also upon the ship, the "tramp" steamers charging less than the regular Transatlantic liners. At present the freight rates are from 8/6 to 9/ per ton, but within four years they have been as high as 16/ Having made proper allowance for the cost of carriage, there remains the duty, which is 1 cent a pound. This scheme of estimating assumes that the plates were bought for cash in England, which would necessarily be the case unless the buyer had an established credit abroad. If bought on time interest would, of course, have to be added. We believe, however, that it is the invariable rule in the tin-plate trade for the importer to pay cash, though the consumer who buys the plates from him in this country gets credit.

To illustrate by a practical example, let us assume that a consumer wishes to purchase 500 boxes IC 14 x 20 Bessemer steel plates, coke finish. At 13/ per box, f.o.b. Liverpool, the cost would be 6500/ or £325. With sight exchange at $4.88, this would amount to $1586. Deducting 4 per cent. for cash, we find the net price to be $1522.56. Though the term f.o.b. should mean delivered on the ship without charge, in reality plates so quoted are too often only f.a.s. (free at ship), and it is not unfair in an example of this kind to allow 1/3 or, say, 30 cents per ton for cartage and handling. In the case considered, this would be $8.10, and adding also the town dues of 9d. or 18 cents per ton, amounting to $4.86, we get the sum of $1535.52. The consular invoice, the charge for which varies somewhat at different ports, must next be taken into account. It should be borne in mind that the consular charge at any given port is the same, whatever the value of the invoice, and while it will be relatively a small item on a large importation the percentage will increase with the lessening value of the invoice. Assuming it to be 14/, or $3.50, the cost of the 500 boxes of plates on board ship at Liverpool will be $1539.02. The importer may insure his plates against either partial or total loss, and as there is more chance of the plates being damaged on the voyage than totally lost, it goes without saying that the insurance rates against partial loss are the greater. Present rates are from $\frac{3}{8}$ to $\frac{1}{2}$ of 1 per cent. to insure against total loss, and $\frac{5}{8}$ to $\frac{3}{4}$ of 1 per cent. to insure against partial loss. We believe it is common practice, however, to insure only against total loss, so taking the rate at $\frac{1}{2}$ of 1 per cent. and figuring on 10 per cent. above the cost of the plates, or $1674,82, we find it to be $8.37; adding this to $1539.02 we find the cost of the plates insured to be $1547.39. As mentioned above the freight rates vary according to circumstances, but 9/ per ton of 2240 pounds may be taken as the current charge. The gross weight of the 500 boxes, at 120 pounds per box, will be 60,000 pounds, or, say, 27 tons, which, at 9/ per ton, cost 243/, or about $60; adding this to the cost of the insured plates we get $1607.39 as the cost of the plates on dock at New York. Though the plates are now in this country the purchaser cannot obtain them until he has settled with the custom house. To avoid the trouble of attending in person to the payment of duties it is usual to employ a custom house broker who will charge, say, $3.50 irrespective of the value of the invoice. It may be mentioned that this is a low charge for brokerage, it being $5 at the other ports of entry. The 14 x 20 IC plates weigh about 108 pounds net to the box, and as the tariff is 1 cent per pound, the duty on the lot will be $540, or $543.50 with the brokerage, no account being taken of certain minor custom house fees. Adding this to $1607.39, the cost of the plates on dock, we find the total cost of 500 boxes IC 14 x 20 Bessemer cokes, delivered on dock in New York, to be $2150.89, or $4.30 per box. At 13/ per box Liverpool the plates were worth in our currency, say, $3.17, so that the total charge per box of importing was $1.13, or about 35½ per cent. on the quoted foreign price. We would not have our readers take the above example as a reliable guide, for apart from the varying freight, insurance and other charges, there are a number of expense items which it would be impossible to correctly allow for in a suppositive case, but which must always be met in an actual business transaction. Not to mention the trouble involved, which ought to be entered at a cash valuation, there is the general item of interest, which cannot be definitely specified.

Furthermore, there is no account taken of possible delays, or perhaps it would be nearer the truth to say probable delays—and, finally, if the plates are not of a satisfactory quality, the individual buyer has no foreign agents or correspondents through whom he can obtain redress. A company whose sole business is the importation of tin plates of course "know the ropes" perfectly, but to a novice in the trade these same "ropes" will present an inextricable tangle. The example we gave was made as simple as possible, being a single large order for one grade of plates, but where a buyer wanted several kinds of plates, or maybe only a few boxes, the trouble and expense of importing direct would be proportionately increased.

Steel rails weighing 90 pounds per yard have recently been rolled by the Bethlehem Iron Company, of Bethlehem, Pa., for use on the Reading Railroad. These are said to be the heaviest steel rails ever rolled in this country. It is rumored that both the Reading and Jersey Central roads are going to renew the track on their main lines across New Jersey with steel rails weighing from 89 to 92 pounds per yard.

A joint committee of the City Council and the Board of Trade of Akron, Ohio, made a tour of investigation to ascertain what system would best be suitable to provide the city with gas for fuel and lighting. They looked into the Westinghouse, Loomis and Archer systems, and their report, an interesting document, which is favorable to the Loomis system, has been printed in pamphlet form, by T. William Harris & Co., of 44 Broadway, this city, who are builders of the Loomis plant.

Influence of Aluminium on Cast Iron.*

BY W. J. KEEP, C. E.; PROF. C. F. MABERY, S. D., AND L. D. VORCE.

Aluminium is a metal obtained from its oxide, alumina. It is white in color and very tenacious, and it alloys readily with iron. Cast iron, ordinarily used, is iron which contains all the carbon that it could absorb during its reduction in the blast furnace. This carbon, when found in chemical union with the iron, is called "combined carbon." In this state it cannot be seen. It is also found mechanically mixed with the iron in the form of graphitic carbon, when it becomes visible. Other elements commonly found in cast iron are phosphorus, sulphur, manganese and silicon. The natural condition of carbon in iron is the combined state. The presence of silicon drives a portion of the carbon into the graphitic state. Sulphur, manganese and phosphorus do not cause the carbon to leave its natural combined state, and if silicon be present these elements either drive it out or overpower it. Carbon is, therefore, a passive element, and is made to change its form by the presence of other elements. It is this change of carbon which indicates, to the eye, the influence of any element upon the cast iron. Iron and combined carbon, or carbureted iron, is called "white iron," and the grain is generally very fine, and often even, and the metal is very hard. Graphite darkens the fracture until it becomes a very dark gray, and the grain is coarse and irregular. With increase of graphite the metal becomes soft. We shall confine ourselves in this paper to the influence of aluminium upon cast iron.

Let us for a moment review the present knowledge on this subject. It is known that fused wrought iron, or a mixture of cast iron and steel or steel alone, either of which would make castings which would be full of blow-holes, will make solid and homogeneous castings if as small a quantity of aluminium as one-tenth of 1 per cent. is added just before pouring. Also that such addition causes the iron to remain fluid long enough to allow its being cast into molds. It seems to be the general opinion that the aluminium does not remain in the metal, but that it exerts its influence between the time of its introduction and the time of its departure. This seems to be the sum total of the present information regarding the influence of aluminium upon iron.

We propose in this paper to give the results of a series of very carefully conducted tests, to further substantiate the statements just made, and to settle the question as to whether aluminium remains in the casting. Also to determine the influence of this metal upon the physical structure and upon the composition of iron. The physical tests that we have employed are what are known as "Keep's tests," and by them we are enabled to make apparent to the eye the influence of any element upon cast iron. When it was understood that we were to undertake this examination, the Cowles Electric Smelting and Aluminium Company, of Cleveland, kindly furnished us with what ferro-aluminium we needed, and Prof. C. F. Mabery and L. D. Vorce, of the Case School of Applied Science, of Cleveland, volunteered to undertake the chemical examination of the test bars. The results of these investigations will be appreciated when it is understood that we began without the expectation of the very important results we have obtained, and that the methods for the determination of minute quantities of aluminium were so imperfect that the small quantities used in the "Mitis" process could not be determined if they still remained in the castings.

Regarding the physical tests, we should state that we use two bases—one a white iron, with composition, Si., 0.186, P., 0.263, S., 0.0307, Mn., 0.092; the other a gray Swedish iron marked "FL M." with composition Si., 1.249, P., 0.084, S., 0.04, Mn., 0.187. The ferro-aluminium contained Si., 3.86 and Al. 11.42 per cent. The melting was done in a covered plumbago crucible, in a coke furnace driven by a blast of 2¼ ounces. The test bars were 1 foot long, and cast in pairs; one ½ inch square, and its mate $\frac{1}{10}$ inch thick and 1 inch wide.

We started with 30 pounds of the base in the crucible; at the first heat there were cast four pair of bars from the base alone, which took 5 pounds of metal. After allowing the remaining metal to become solid, we returned the runners of the first cast, and added 4 pounds of the base, and returned the crucible to the furnace. When nearly melted, we added enough ferro-aluminium to bring the percentage of aluminium in the whole to where we wished it, for the second set of bars. We proceeded in like manner through the entire series of heats. To arrive at the influence of the aluminium, we made another series of heats, with the same base, with exactly the same conditions, only we did not add the aluminium. The difference between the two series of tests gives the effect of the aluminium.

We shall consider this subject under the following heads:

The solidity of castings and the prevention of blow-holes.
Does the aluminium remain in the iron to exert an influence when the iron is remelted?
The effect of aluminium upon the grain or the changing of the carbon from the combined to the graphitic state.
The taking away the tendency to chill.
The prevention of sand scale.
The effect upon hardness.
The resistance to a load gradually applied or a dead weight.
The resistance to a load suddenly applied or impact.
The elasticity.
Permanent set.
The effect on the shrinkage of the iron.
The fluidity of the melted metal.

1. *The Solidity of Castings and the Prevention of Blow-Holes.*—All of our tests bear upon this subject, but we have made one test, using the white base iron, and one-tenth of 1 per cent. of aluminium. It is also impossible to get a solid casting of the white base alone, and its resistance to weight is generally about 175 pounds for the ½-inch square bars, and its resistance to impact is about 100 pounds. We have obtained, however, exceptionally sound castings of this base, and we shall use the strength of such castings for comparison. These sound castings of the white base alone resisted a weight of 379 pounds. With one-tenth of 1 per cent. of aluminium added, it resisted 545 pounds, a gain of 166 pounds, or about 44 per cent., from this small addition. Measuring the resistance to impact the white alone was 239 pounds; with aluminium, 254 pounds, or about 6 per cent. gain. The castings appear of slightly finer grain, and the character of the crystallization is somewhat different, but the secret of the strength lies in the closing of the spaces between the grains—or, in other words, in the increased solidity of the casting. No other change is noticeable in the metal. A graphic representation of this test is not needed.

2. *Does the Aluminium Remain in the Iron to Exert an Influence When the Iron is Remelted?*—To determine this we made a series of six heats from the white base, and added to the first heat one-fourth of 1 per cent. of aluminium. This amount alters the grain very perceptibly, making it whiter and finer, and removing the tendency of the base to a slight specular appearance, and giving a homogenous fracture. It increases the strength above the base about 20 per cent. to resist weight, and for impact an increase of over 70 per cent. The next heat was a remelt of the first, with the runners of the first cast put back, and enough white base added to reduce the aluminium to two-tenths of 1 per cent. when the second cast was made. Our comparisons will now be made between this series and the comparison series of the base alone. Looking at the chart, Fig. 1, we see that

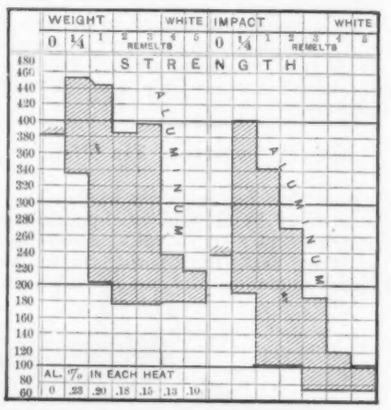


Fig. 1.

the effect of the aluminium in this second heat is greater than it was in the first case to which heat the aluminium was added. This is due to the increasing porosity at each heat of the base when melted alone, and to the solidity of the series with aluminium. At the third and subsequent heats the same result is apparent, the remaining aluminium causing more solid castings, though the continued additions of white iron at each heat, and the consequent lessening of aluminium, render the castings less strong at each remelting. Yet the effect of the aluminium is so constantly apparent at each melt as to leave no doubt as to the presence even in the sixth remelting. The chart, Fig. 1, which we have prepared, shows these effects, both as to weight and impact.

As we proceed with the description of other tests, it will be noticed that we add but a small quantity of aluminium at each heat, and depend upon the additions made at previous heats to bring up the required percentage. The results of the tests show conclusively that the aluminium remains and exerts its influence in subsequent casts as fully as would be expeeted.

3. *The Effect of the Aluminium upon the Grain, or the Changing of Carbon from the Combined to the Graphitic State.*—Let us say a few words in regard to the way in which, and the reason why, carbon takes on the graphitic form. All of the carbon, both combined and graphitic, which the iron is capable of holding when solid must be dissolved and exist as combined carbon in the melted iron. Cast iron made in the usual way contains all of the carbon that it can hold. Very often cast iron, when melted, contains more carbon than it can hold in combination when at a lower temperature; if so, as the iron cools down such excess of carbon will separate and rise to the surface. In any case, when a melted iron contains more carbon than the iron can hold in combination when cold, all of the excess will not be able to reach the surface, though it may not be visible in the casting to the eye. The introduction of other elements into the melted metal may alter its ability to hold the carbon. Sulphur causes it to let some go, while manganese enables it to hold more carbon in solution. Silicon also somewhat diminishes the capacity of the molten

* Read by W. J. Keep, at the Cleveland Meeting of the American Association for the Advancement of Science, August 17, 1888.

metal to retain carbon while it is in liquid. Aluminium allows most of the carbon to retain its natural combined form until the metal is too thick for the separated carbon to escape, but at the instant of solidifying aluminium causes the iron to drop a portion of its carbon from the combined state. This liberated carbon takes the graphitic form, and is imprisoned in the otherwise solid iron.

The advantages arising from a change of carbon from the combined to the graphitic state, at the instant of crystallization, are that all of the carbon thus liberated is imprisoned uniformly throughout the casting, and is not accumulated in pockets, forming soft and hollow spots, as would be the case if liberated while the casting was yet fluid. Aluminium more than any known element accomplishes this. It not only changes white iron to gray, but seems at once to change the whole character of the metal. The drop of carbon seems to be instantaneous at the instant of crystallization, and for this reason the time taken in cooling has little effect. In fact, when the aluminium obtains full control of the carbon it would seem that the more sudden the cooling the more the formation of the graphite, and the thin portions of the graphite are therefore as gray as the thicker portions. The powerful and positive influence of aluminium upon the carbon, and therefore upon the grain and color of the iron, is shown by an examination of the series of samples that we present here to-day.

Take those made from the white iron base, with almost no silicon present; the

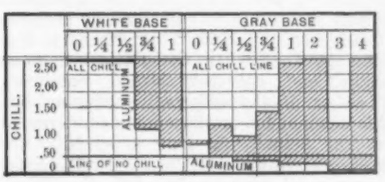


Fig. 2.

base alone gives a white bar full of blowholes. An addition of one-fourth of 1 per cent. aluminium gives us not only a perfectly homogeneous and solid casting, but the color is darker, and the grain shows that some of the carbon has taken the graphitic form. The thin casting shows this even more than the heavier bar, showing that the change occurred suddenly and that time had but little effect. Examining each bar in turn, we see that each similar addition of aluminium produces a corresponding effect until, at the third addition, or with three-fourth of 1 per cent., the casting is gray, with no sign of white, either in the square or in the thin bar.

The set of tests with the gray iron base, containing 1¼ per cent. of silicon, shows that silicon and aluminium work together in the same direction, and that a slight addition of aluminium takes the white out of the casting at once, giving the same grain in a thin as in a thick casting. This effect increases as the aluminium increases, and the indications are that at least up to 4 per cent., the limit of our experiments, the more the aluminium, the softer and grayer the castings.

4. *The Taking Away the Tendency to Chill.*—If cast iron be cooled very suddenly, the carbon, which the melted metal holds in combination, will not have time to separate, and will be retained in the combined state. Such castings are called chilled castings. Chill is caused by molten iron running against a body which rapidly withdraws its heat, causing it to retain its carbon in the combined form. Back from the chill, where this instantaneous cooling could not exert its full effect, a portion of the carbon takes the graphitic form. This property is made use of when it is desirable to obtain hard wearing surfaces, and, in the same casting, tough and soft central portions, as in car wheels. While this chilling effect is exceedingly valuable for many purposes, yet, generally speaking, the founder desires exactly the reverse.

We have said that aluminium causes the carbon to assume the graphitic form on

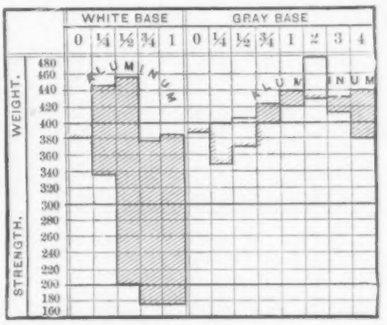


Fig. 3.

instant of solidifying, and therefore the sudden abstraction of heat does not imprison the combined carbon and cause chill. This effect of aluminium is to give a uniform grain for thick and thin castings, and not allow the coldness of the mold to affect the grain. Fig. 2 gives graphically the results of experiments made.

5. *The Thickness of Sand Scale.*—This is an important consideration, for the sand must be cleaned from the casting, and the surface must first be cut before the interior can be reached. To prevent the iron from burning the sand into itself and thus forming a scale, a plumbago facing is sifted on the surface of the mold, but it is difficult for the facing to lie on the surfaces or to resist the intense heat of the metal. When aluminium in an iron causes the dropping of the graphite from the mass of the metal, that graphite which is on the surface of the casting separates and forms a perfect plumbago facing, which opposes the sand and the heat. It will, therefore, be seen that in castings having sufficient aluminium to cause this separation of graphite, there will be no sand clinging to the face, and that the surface will be as soft as the interior of the casting. Every ironworker will appreciate this good effect of aluminium.

6. *The Effect upon Hardness.*—Hardness in cast iron is caused by the carbureted or white iron in masses large

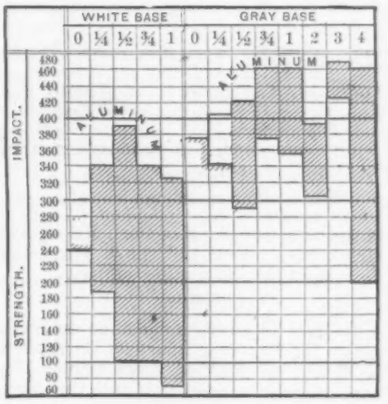


Fig. 4.

enough to oppose the tool. If the carbureted iron exists in minute threads stretched around atoms of graphite, a tool will easily cut it and it will not be considered hard. This graphitic carbon, minutely dividing the mass, gives the tools of the workman a chance to cut or break the films of metal, giving what we call softness to the iron. The later the carbon is dropped the smaller will be the atoms of graphite and the closer the grain. Yet this greater subdivision will, for the reason just given, make the iron work more easily. The fineness of the grain of iron affected by aluminium causes such iron to be much more easily cut than iron of coarser grain. The next question to consider is that of strength. The power of wrought iron and steel to resist extension is so great that where such stresses are to be resisted decarbonized metal should be used. The resistance of any cast iron to crushing is so great that we need not consider this. The forces which cast iron should be made to resist, aside from crushing, are a dead weight, or a blow applied transversely. We should, therefore, test cast iron with these forces.

7. *The Resistance to a Load Gradually Applied, or a Dead Weight.*—If we compare the transverse breaking weights of the two series which we have been considering, number by number, we perceive that the aluminium has increased the strength to sustain a constant load. This is a very important effect, and perhaps comes partially from the tenacity and strength of

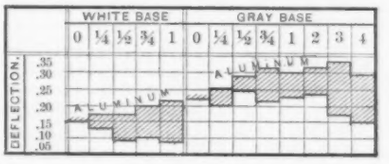


Fig. 5.

aluminium itself, but probably more from the uniform grain of the iron. Fig. 3 is a record of the tests.

8. *The Resistance to a Load Suddenly Applied, or Impact.*—It may be thought that the effect is substantially the same, whether the force be a constant weight or a suddenly applied blow. We shall at a future time prove that the effects are not the same, and that an iron should be tested by a blow if it is expected to resist impact. By a comparison of the graphic representation, Fig. 4, we see that the capacity to resist impact is increased by the addition of aluminium much more than the capacity to resist a dead weight. It will be seen at a glance that the test bars made with the white base are benefited far more than those made with the gray base. The reason for this is, that the white base alone made porous castings; at each remelt this porosity increased, due to the continuation of the heat, running the strength down to 68 pounds at the fifth heat. The first, and each subsequent addition of aluminium, caused the castings to be perfectly sound, and the infinitessimal atoms of graphite deposited throughout the metal removed the rigidity and brittleness of the initial metal. The gray iron base contained enough silicon to accomplish all this, and the only effect on strength that the action of the aluminium on carbon could have would be to increase the fineness of the grain, unless the toughness of the aluminium itself could give strength to the casting, though the aluminium no doubt removed any slight blowholes that existed in the initial gray metal. This leads us to notice that each addition of aluminium increases the strength over that of the initial metal. We must expect that after we have added enough aluminium to cause a solid casting, and to remove the brittleness that the dividing up of the mass by the atoms of graphite accomplishes, any further additions of aluminium, and consequent increase of graphite, which has no strength of itself, must weaken the casting.

9. *The Elasticity.*—The compactness and closeness of the grain of cast iron when aluminium was the agent by which the

graphite was precipitated and the fine attenuation of the veins of carbureted iron cause the metal to be very elastic, and, as we have seen, not so brittle as without aluminium. Fig. 5 illustrates this.

10. *Permanent Set.*—This is caused by the compression of the graphite within the framworke of carbureted iron. When this compression of graphitic carbon is produced by transverse bending the framework of the metal also takes on a permanent form, which cannot be altered except by a greater force than was before applied. The fineness and compactness of iron alloyed with aluminium gives less permanent set than iron equally as soft when such softness is produced by silicon.

11. *The Effect on the Shrinkage of the Iron.*—The more suddenly and completely the carbon is changed from combined to graphitic, at the instant of crystallization, the more space will the casting occupy. When the casting is cold it will therefore have contracted less than if more carbon had remained combined. White iron, having most of its carbon in the combined state, shrinks from $\frac{1}{4}$ to $\frac{1}{8}$ inch in each foot. Gray iron sometimes shrinks as little

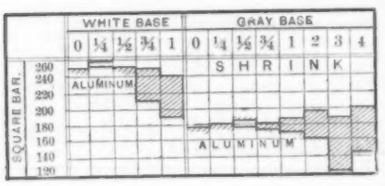


Fig. 6.

as $\frac{1}{16}$ inch to each linear foot. As the combined is the natural state for the carbon, we may say that this maximum shrinkage is the natural shrinkage for cast iron having its carbon combined. We can therefore say that aluminium takes out or reduces shrinkage when a sufficient quantity is added. This is a very great advantage, as shrinkage requires great skill in the preparation of patterns to prevent warping and cracking, and violent internal strains within the castings. The lessening of shrinkage avoids these evils, and is therefore a great gain. Fig. 6, the shrinkage chart, furnishes the most conclusive proof of our explanation of the way in which shrinkage is lessened. With both the white and the gray bases, during the first two additions, the shrinkage of the square bar is slightly increased. The influence of the aluminium thus far has been in the direction of elimination of blow-holes, and causing an even distribution of the dark and light grains. At the third addition, however, when the amount reached three-quarters of 1 per cent., the effect was appreciably felt upon the carbon, as seen by the color, and as we should expect, from the deposition of this large bulk of graphite; the casting does not shrink as much, and each addition of aluminium increasing this bulk of graphite decreases the shrinkage. The effect upon the grain and color of the thin bars of the series is very remarkable, showing that the aluminium has changed enough carbon to graphite to produce a dark even grained casting. The effect upon the shrinkage of these thin bars (see Fig. 7), is as we should expect, and is more marked even than in the square bars. The shrinkage in the thin bars of the white series shows a constant decrease as the aluminium increases, but in the series for comparison, the shrinkage dropped still more rapidly. If a new crucible was used in commencing this comparison series, enough silicon might have been absorbed to produce this effect. This leads us to remark that on account of the variations of conditions in any series of tests, that cannot be foreseen, we must avoid drawing any but general conclusions, and these should be based upon a large number of experiments.

12. *The Fluidity of the Melted Metal.*—Our tests of fluidity (see Fig. 8) are correct as far as each individual heat is concerned, but variation may be due to the heat of the metal of that particular cast when poured. Viewed in a general way, the indications are that with the white base, with almost no silicon, the aluminium has increased the fluidity; but judging

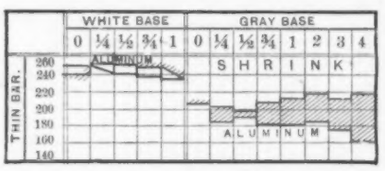


Fig. 7.

from the series with the gray base, we would say that, combined with silicon, aluminium reduced the fluidity. Our remarks in connection with shrinkage show that a sharp casting is produced by the instantaneous dropping of graphite when crystallization takes place, and that if the iron is fluid enough to fill the mold, any extra fluidity causes the iron in shrinking to draw away from the mold. Again, the percentage of aluminium necessary to bring about these desirable results will be too small to have much effect upon the fluidity of the metal. The fact of the iron giving sharper and more perfect castings on account of the swell of the casting, caused by the deposition of graphite at the instant of solidification might cause the iron to be pronounced more fluid, if judged by the appearance of the castings. No doubt the presence of varying quantities of manganese, sulphur, phosphorus and silicon in the cast iron used would modify the influence of aluminium, and until this is understood it may require considerable experiment to determine the amount of aluminium required or how it shall be introduced.

This hurried presentation of the remarkable effects of aluminium upon cast iron will give an idea of the great benefit which is now promised to the iron founder by the rapidly falling price of aluminium as cheapened by the electric furnace. Following the publication of this part of the subject we shall soon present the results

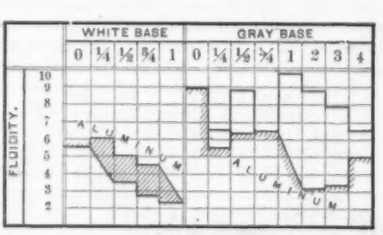


Fig. 8.

of the laboratory work of Prof. Mabery and Mr. Vorce, which will throw still more light upon this interesting subject.

We find in an article from an unknown source the following values for the traction coefficient on different roads under ordinary average conditions: "Railroads in good condition, the axles well lubricated, 4 pounds per ton of load; upon railroads under ordinary, but not very good, condition, 8; upon a very smooth pavement, 12; on ordinary street pavements in good condition, 20; on street pavements and turnpikes, 30; on turnpikes new laid with coarse gravel and broken stone, 50; on common roads in bad condition, 150; on entirely loose ground or sand, 560."

The Perils of Steam Navigation.

Another ocean horror emphasizes the fact already established that our best built steamships have a vulnerable part which all the devices yet contrived fail to remedy. The Danish steamer Geiser, from New for Copenhagen, with 149 souls on board, while near Sable Island on the 14th inst., was struck on the starboard side amidships with terrific force by the steamer Thingvalla, of the same line. The blow was received between the coal bunkers and the engine-room. In about five minutes the ill-starred ship, which had been cut nearly in twain, was engulfed in the sea, taking down 118 persons, only 14 of the passengers and 17 of the crew surviving. The Thingvalla's bows were carried away completely as far back as the collision bulkhead, which yielded perceptibly to the tremendous pressure of the sea, but no time was lost in rendering it more secure, thus saving the ship from the fate of her consort. The Cunard steamer Oregon, it will be remembered, speedily went to the bottom, although struck only by a collier. It is always so when the engine compartment fills with water, on account of the disproportion of the flooded space as related to other divisions of the ship. Vessels built on the cellular plan of construction have been pronounced "unsinkable," but it remains to be demonstrated that they are really so when subjected to the severest test.

The loss of the Geiser will be the subject of official investigation before the Danish Admiralty Court. The material facts, however, are obvious to the ordinary reader of the news, and the conclusion seems inevitable, as expressed by high authority on the New York Maritime Exchange, that when the critical moment came, and collision seemed imminent, "either of the officers in command lost his head, or his orders were misunderstood at the helm." So long as speed is the ruling ambition and the chief reliance for commercial success in Atlantic Steam Navigation, any proposition to protect the engine compartment by means of heavy plating would be promptly rejected, since it would neutralize this indispensable quality by adding tonnage which would be superfluous except in extreme emergencies such as might never occur. Moreover, it is hardly supposable that any device of this character would endure the impact of a laden steamer like the Thingvalla, even if engines were "slowed down." Ocean travelers of to-day deliberately elect to take the fastest steamer, assuming the chances of collision or any other possible form of disaster. And this they are encouraged to do by the small ratio of fatalities on the ocean highway compared with those which overtake travelers by rail or other modes of conveyance.

The lamentable fate of the Geiser seems to enforce at least one obvious truth—namely, that safety at sea depends on skillful navigation, the vigilant use of signals and the sounding lead, rather than on further improved mechanical appliances of any kind whatever. The resources of human ingenuity in this direction seem to be well-nigh exhausted. The subject of "ocean steam losses," however, has hardly received the attention which the safety of travelers demands. The strict observance of certain limits in defining the course of steamers on their outward and homeward trips respectively would do much to lessen the perils of ocean travel.

A Mexican letter says, there is much more attention given to agriculture in that country, and that large importations of American agricultural machinery are being made, as it is found that the Americans make lighter and stronger machinery than the English.

MANUFACTURE OF ALUMINIUM.

THE CASTNER PROCESS IN OPERATION.

The English technical newspapers contain accounts of a visit made lately by a party of scientists to the new works of the Aluminium Company, Limited, at Oldham, where new works have been built for the production of aluminium by the process of H. Y. Castner, a New York chemist. The works are in close proximity to the Oldbury Station of the Great Western Railway, and contiguous to Messrs. Chance Brothers' alkali works, from which an important part of the raw materials employed in the manufacture—namely, caustic soda and hydrochloric acid, are derived. The processes included in the manufacture are the production of sodium by Castner's method, of the double chloride of sodium and aluminium, and the reduction of aluminium from the latter salt by the action of sodium. The first of these, which is in many ways the most interesting of the different operations, is effected by the action of a very intimate mixture of carbon and iron obtained by coking a mixture of pitch and finely divided iron upon melted caustic soda at a strong red heat. The operation is performed in large cast-steel crucibles, attached to the head of a hydraulic plunger, which are pressed against a fixed arc and delivery pipe, the whole arrangement forming a kind of still which is heated by gas from a Wilson producer running with heated air. The active reducing agent is carbon, the purpose of the iron being merely to ballast the carbon and prevent it floating to the surface of the molten alkali. About one-third of the latter is reduced, and distils over into a tubular receiver connected with a cylindrical pot filled with naphtha, which receives the condensed melted sodium. The remainder of the alkali becomes carbonized, and the receivers, when cooled, are lixiviated in a tank, giving a solution of carbonate of soda, which is pumped back to the alkali works to be reconverted into caustic.

The pots now used are about 18 inches in diameter, 2 feet high, and contain about 80 pounds of materials. When the distillation is completed the pot is removed from its seat, drawn by a pair of tongs on a bogie to the discharging pit and emptied, a fresh charge being added without allowing it to cool. In this way, and by subjecting the materials to a preliminary heating before charging, the time of one operation has been reduced from two and a half to one and a half hours. A maximum quantity of 14 pounds of sodium may be obtained by one operation, and the capacity of the four furnaces, each having five reducing pots, is about 1500 pounds of sodium per day. The sodium when collected is melted in heated petroleum, and cast into rectangular bars about a foot long, a form which is convenient for packing in petroleum tins. When required for export the tin filled with petroleum and sealed is placed within a new tin partly filled with lime and petroleum, which apparently protects the metal in the inner tin from oxidation. The next operation, the preparation of aluminium chloride, is performed by the slow action of gaseous chlorine upon a mixture of alumina and carbon placed in a retort and strongly heated. The alumina obtained, as nearly pure as possible, is thoroughly incorporated with the carbon in the form of lampblack by drying and molding the mixture in a small drain-pipe machine. The chloridizing furnaces resemble small open-hearth regenerative steel furnaces, each one having five D-shape clay retorts on the bed which are charged from one end and are connected with a condenser at the other, the charging side being also provided with a chlorine feed tube. The chlorine is made in stone stills in the usual manner from manganese ore and hydrochloric acid, the latter being laid on by a main from Messrs. Chance's works. Originally the gas was delivered directly from the stills to the retorts, but owing to an explosion from some irregularity in the working of the latter it is now stored in gasometers, and the supply to each retort is controlled by a delicate hydraulic regulator, which can be adjusted by simply turning a cock to deliver the gas in quantities varying from about 50 pounds to 300 pounds in 24 hours.

The charge of the retort requires from two to three days to work it off, and the working capacity of the 12 furnaces is about 6000 pounds per day. The mixed double chloride of sodium and aluminium, containing about 12 per cent. of the latter metal, is finally reduced by heating it with sodium and cryolite, 80 pounds of the double chloride, 26 pounds of sodium, and 30 pounds of cryolite, ground to a fine powder, giving 8 pounds of metallic aluminium, which contains about 98 per cent. of the pure metal, the rest being mainly iron and silicon. The reducing plant is still to some extent in the experimental stage; a small reverberatory furnace with a bed made of alumina and fire-clay having been tried in conjunction with two forms of crucible furnaces, the latter being so arranged that the melted metal as it forms may fall through a hole in the bottom into a collecting pot placed below. No one of these forms of apparatus has yet been decisively adopted; but the experiment seems to show that some form of crucible furnace working continually is likely to be most advantageous. When fully at work, the producing capacity for aluminium will be about 500 pounds daily, at about 15/ per pound, and 9d. per pound for sodium. The company, in addition to the pure metal, produces all the varieties of copper alloys known as aluminium bronzes, with from 2½ to 10 per cent. of aluminium, and a 15 per cent. alloy with iron for a base in the production of soft iron castings.

Iowa Shippers Up in Arms.

A meeting of jobbers and manufacturers of Iowa cities was held at Davenport, Iowa, on the 14th inst., for the purpose of sustaining the Iowa Commissioners in the railroad rates they have proclaimed, and obtaining relief from alleged discriminations made by the roads against the shippers of the State. Representatives to the number of more than 100 were present from Davenport, Dubuque, Clinton, Muscatine, Burlington, Ottumwa, Des Moines and Keokuk. W. H. Torbert, of Dubuque, was chosen chairman. He said the great interests of the State were struggling for the right to live. There is no disposition, he affirmed, to ruin the railroads, but firmness would be insisted on.

Governor Larrabee was introduced and received with applause. The Governor presented his well-known views at some length, and gave his experience as a manufacturer and shipper, he being the owner of a large flouring mill. He said the business men had assembled "to protest against the wrongs that are inflicted by the railroads upon the jobbers, manufacturers and farmers of Iowa, and to formulate plans for united action. Railroad managers, by denying that abuses exist, seek to impeach the testimony of three-fourths of the people." The Governor reviewed the history of railroad legislation.

Fred. Wild, an old railroad manager, now engaged as secretary of the local shippers' association, gave tariff statistics and percentage comparisons from many points to others inside and outside of the State, showing how business is oppressed by existing schedule rates. The Hon. Jones T. Lane gave a legal view of the case. Mr. Lane is the counsel of the railroad commissioners. He says the railroads have not raised a single point they will dare carry to the Supreme Court of the United States. Their hue and cry was but a conspiracy to throw dust in the eyes of the people of Iowa.

Robert Donahue, of Burlington, also addressed the meeting. A committee on organization was formed, composed of Fred. Wild, of Davenport; Robert Donahue, of Burlington; W. Lange, of Dubuque, and J. R. Baldwin, of Clinton. An evening session was held, but it was of a strictly private character. The reported object was the formulation of plans for a legal contest.

Corporation Wrecking.

Railroad wreckers were roughly handled in a decision rendered in Chicago last week by Judge Tuley in the case of the Smith Bridge Company *vs.* Henry Crawford. The plaintiffs claimed that in 1882 they constructed two bridges over the Wabash River for the Chicago and Great Southern Railroad, under contract, for $21,000; that Mr. Crawford, who undertook to build the road, did so under a construction contract, having claimed that he had no interest in the company, whereas, in fact, he owned $2,400,000 of the stock. It was further claimed that this contruction contract was made through a dummy board of directors, the contract being made to himself; that as soon as the contract was completed he caused a mortgage he held on the railroad to be foreclosed and a receiver for the entire assets appointed. The old company being thus burst up, a new company was created. In this way every creditor of the old company, including the complainants in the present suit, were left without any means of satisfying their claims. "The time has come," said the Judge, "when the courts must rise equal to the emergency that is now upon them, equal to the changed conditions and methods of transacting the affairs of corporations, and hold that the manipulators of corporations do not lose their identity because they hide behind corporate forms and proceedings. Trusts, heretofore unknown to the law, are formed to manipulate corporations, by which the people are oppressed and the powers of the State defied. Corporation wrecking has become an established practice, and parties even use the forms of a court of equity for that purpose. Advanced ground must be taken, and these manipulators of corporations, whether 'trustees' or 'wreckers,' must be held personally accountable for corporate assets which get into their possession and for all profits made by their manipulations in their private interests of corporate property or corporate franchises. The courts must in such cases apply the rule which courts of equity apply in all other transactions and deal with the real party, the moving party, the real actor, and will grasp the substance without regard to the obscuring forms under which it may be hidden."

At the last meeting of the Quebrada Railway, Land and Copper Company, the concern operating copper mines in Venezuela, the chairman stated that under their contract with the Société des Métaux the company are guaranteed £70 per ton of best selected, the production being limited to 12,960 tons of copper, as its equivalent, for three years. During the course of his remarks the chairman said: "The producers of copper may find it wiser to limit their production of copper in the future to such quantities as they can sell at a reasonable profit than to go on producing larger quantities at a loss and exhausting their mines into the bargain."

English Capital at Cumberland Gap.

The American Association, Limited, with headquarters at Knoxville, Tenn., is an English syndicate, composed of the following directors: E. A. Pontifex, president, who is also president of the Cape Copper Mining Company, of London; Dilwin Parrish, who is also president of the London Telephone Company; Thomas Brooks, of Manchester, coal master and banker; Thomas Ashton, banker and manufacturer; N. Story Maskelyne, M. P. and, Jacob Higson, of the Ebbwvale Steel Company. Mr. Higson, who has other large interests in England, is a man of great experience, and has directed a great deal of foreign money to this country. Clarence Carg, of New York, is another director. Several large stockholders are heavy coal operators in Great Britain. The general manager of the company is Mr. Alex A. Arthur, at Knoxville, Tenn. The syndicate owns Cumberland Gap and 60,000 acres of mineral lands adjoining, lying in the States of Kentucky, Virginia and Tennessee. These three States corner in on the top of the Gap. This region of country has for a long time been known to be underlaid with deposits of iron ore and coal, but being unaccessible to markets the lands were of little value. Recent geological surveys and publications by the State of Kentucky caused foreign capitalists to make investigations, which has resulted in large investments in Eastern Kentucky coal fields. The company is now tunneling Cumberland Gap, and will open it to all railroads. The Louisville and Nashville Railroad is now building an extension from Pineville, and will connect with a new road from Atlanta. Two other roads are approaching this point to make connection, and five additional lines are negotiating for the right to run through the tunnel. Claims to have Oriskany ore running 56 per cent. metallic iron with only trace of phosphorus; red fossiliferous ore in abundance, with 58 per cent. iron; a carbonate iron, with 44 per cent. of iron and low in phosphorus; argillaceous ore, with 47 per cent. of iron and manganiferous ore, running 30 per cent. manganese and 10 per cent. iron. Besides, the Company own Bessemer ore lands in the Allegheny range. It is claimed that an abundance of fine lime rock lies easy of access. The coal deposits are perhaps more bountiful than the ore. Near the Gap there are from 8 to 14 seams, all within reach, among them three beds of Cannel and three beds of coking coal. These coals have been thoroughly tested both in this country and across the water. The Cannel coal of Eastern Kentucky has long been highly valued for gas producing as well as for fuel. Mr. Arthur claims that they will be able to produce steel very cheaply. The company have selected a level valley in which to locate a town, and will call it Middlesboro', after the great manufacturing center of England by that name. Several coal leases have already been let out by the company, and they are now arranging for the first of their furnaces to be put up at once. Including the men at work on the approaching extensions of the railroad, another at work opening up the mines, there are over 5000 laborers in the vicinity, pushing forward this large enterprise.

The Pittsburgh Suspension Bridge.—The Sixth Street suspension bridge across the Ohio River connecting the cities of Pittsburgh and Allegheny is now being inspected in a very thorough and exhaustive manner. The bridge was built in 1856 by John A. Roebling, and was the second of the kind in the country, the first having just been completed at Niagara. The present inspection is under the direction of John A. Roebling, Jr., of New York, and Engineer W. Hilderbrand is in charge o the work. The anchorage of the bridge, by its cables, was considered wonderful when it was built. Eight long links of chain go down into the ground in semicircular form at the ends of the bridge, and to these the cables are attached. At the end of each of the four chains is a heavy cast-iron plate weighing five tons, which is imbedded near the bottom of a mass of solid masonry 35 feet long and 25 feet deep. This masonry has been opened for examination and is in first-class condition. The cables and chains, which were surrounded with tar, have not corroded, but paraffine is being substituted for the tar, and the rest of the wall filled up with big cut stones cemented together. The caps have also been taken off the towers, and all the wires of the cables are being carefully inspected by Mr. Hilderbrand. There is not the slightest break in those so far inspected. The bridge and its anchorage are practically in as good condition as when it was built.

A transparent deposit of platinum can be obtained by covering the bottom of a glass dish with a mixture of platinic chloride and glycerol; this is evaporated to dryness, and finally washed with alcohol to remove the product of decomposition of the glycerol. The metallic deposit is perfectly transparent, the transmitted light being of a dark blue-grey tint. The commercial method of producing platinum mirrors by reducing the chloride with essence of lavender and heating the containing vessel up to the temperature at which the glass softens does not yield a sufficient cohesive product. Transparent layers of platinum and mirror deposits of iron, nickel and cobalt, can also be obtained by electrolytic methods. It is noted that the iron mirror rotates the plane of polarization, the direction of which varies with the direction of the electric current.

New Single-Action Arch Press.

We present in the accompanying engravings a general view and details of one of the latest designs of single-action presses put upon the market by the E. W. Bliss Company, of Brooklyn, N. Y. It is specially adapted for operating sub-presses in the manufacture of watch movements and other small work requiring considerable power and great accuracy. It may also be used in ordinary cutting, punching and forming operations within the range of its capacity. The press frame is of the ordinary arch pattern, and the slide is provided with adjustable V-shaped gibbs to take up wear and keep slide working true. The special feature of the press is in the slide, which is made in two parts and connected with a steel wedge-shaped adjustment, making a practically solid mass of metal between the crankshaft and face of slide, which is especially desirable for heavy or very accurate work.

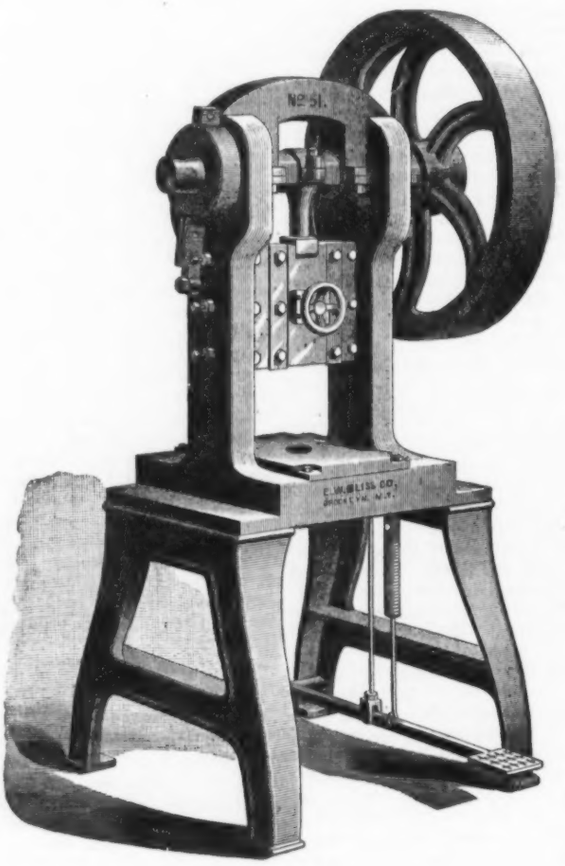


Fig. 1.—General View.

NEW ARCH PRESS, BUILT BY THE E. W. BLISS CO., BROOKLYN, N. Y

The details of this wedge adjustment are shown in Figs. 2 and 3. The mandrel is made in two parts, and a wedge, W, is fitted between these, being operated by means of a screw, S, and handwheel and engaging the slides P R. The hight of the mandrel from the bed can thus be accurately adjusted. A powerful clutching device is used to connect the wheel to the shaft.

This press is designated as No. 51, and its general dimensions are as follows: Width between uprights, 12½ inches; open-

ing in bed as desired; motion of slide from ½ to 4 inches, according to the work; adjustment of slide, $\frac{7}{16}$ inch; balance wheel, 34 inches diameter, 4½ inches face, weight 400 pounds. Total weight of press, 1400 pounds.

Recent Treasury Decisions.

The Secretary of the Treasury has promulgated the following decisions *in extenso*, affecting the customs duties on metals:

LOCOMOTIVE CRANK-PIN TURNINGS.

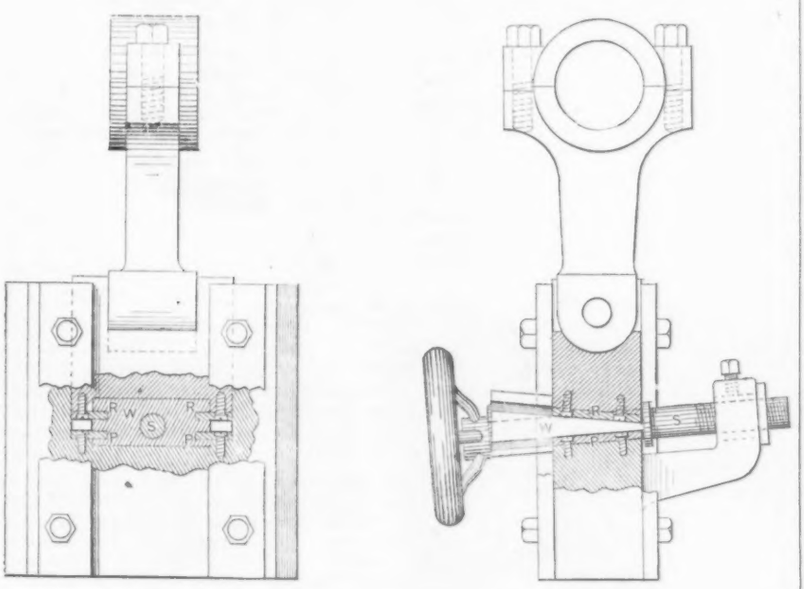
On an appeal from an assessment of duty at the rate of 2½ cents per pound on certain iron locomotive crank-pin forgings claimed to be dutiable at the rate of 2 cents per pound for "forgings of iron and steel for vessels, steam engines and locomotives, or parts thereof, weighing each 25 pounds or more," the Department revokes the assessment. The question involved in this case is whether the term "forgings of iron and steel" used in said provision of law covers only forgings of the two metals combined or both forgings of iron and forgings of steel, and the proper rate of duty on the forgings in question, which are composed of iron alone is dependent on its solution. This question has been submitted to the Attorney-General, who under date of the 2d inst., reports that, in his opinion, the phrase "forgings of iron and steel" in said provision of law, and also in T. I., 167, which imposes a duty of 2½ cents per pound on "forgings of iron and steel, or forged iron, of whatever shape or in whatever stage of manufacture," should be interpreted to include forgings of iron and also forgings of steel, and not alone those in which the two metals are combined in the same forgings. The Department accepts the opinion of the Attorney-General as to the proper interpretation of said provision of law, and you are hereby authorized to readjust the entry in accordance therewith, and to take measures for refunding the excess of duty. This decision revokes the Department's decision of May 16 last, in which the contrary view was held as to certain forgings of steel.

DUTY ON "REMELTING STEEL."

An article called "remelting steel," which upon further investigation was found to consist of the best quality of Bessemer steel slabs or cakes, which are intended for use in the manufacture of finished steel plates, sheets or bars, is held to be dutiable at the rate of 45 per cent. ad valorem for "steel ingots * * * and slabs, by whatever process made, * * * valued at 4 cents per pound or less."

DUTY ON COPPER IN SILVER ORE.

The Treasury Department affirms a decision of the collector at El Paso, Texas, assessing duty at the rate of 2½ cents per pound on the copper contained in certain so-called silver, and entered free of duty as silver ore. The appellant claims that, inasmuch as the ore contains less that 5 per cent. of copper, and as there are no smelting works in the United States which will pay for copper contained in any ore unless the amount should exceed 5 per cent., the ore in question is strictly a free or silver ore. He further claims that the percentage of copper found—viz., ⅝ per cent.—in said ore, having been ascertained by the wet or volumetric method, is excessive, and that the dutiable percentage of copper, if any, should have been ascertained by the dry or fire assay. The decision as to the liability of said copper to duty, being in accordance with T. I., 186, and the Department's decision of November 21, 1887, is affirmed. It appearing from the report that the method which was used in the ascertainment of the percentage of said copper is more accurate than that claimed by the appellant, the decision is also affirmed as to the quantity of dutiable copper found.



Figs. 2 and 3.—Details of Wedge Adjustment.

NEW ARCH PRESS, BUILT BY THE E. W. BLISS CO., BROOKLYN, N. Y.

The lowest bidder for a new fireboat for the protection of the harbor of Boston was found to be Charles F. Elmes, of Chicago, when the bids were opened last week. Unfortunately his bid, though the lowest, was $2000 above the limit allowed by the appropriation, and new bids were called for. He has again entered the lists determined to carry off the contract. He built the engines for the fireboats used in Chicago, which have proved very satisfactory.

On the 14th inst. two large agricultural implement warehouses at Peoria, Ill., with all their contents, were destroyed by fire. One belonged to Martin & Co. and the other to Kingman & Co. The destruction of a large grain elevator at the same time in the same city gives color to the theory that the fires were of incendiary origin. All were covered by insurance.

The Oscillations of High Chimneys.—In the *Mémoires de la Société des Ingenieurs civils* particulars are given of the oscillations of a chimney stack near Marseilles, 35 m. (115 feet) high, with an exterior diameter at the top of 1.22 m. (4 feet). During a severe storm it was determined, by observing the shadow of the chimney, that its greatest oscillation was half a meter (nearly 1 foot 8 inches). It was further observed that a chimney set in motion by a gust of wind oscillates from four to five times backward and forward until it is at rest again. M. E. Burgh asserts that should this momentum during the oscillations of a chimney repeat itself in such a manner that its direction coincides with that of the oscillation, the overthrow of the chimney may be expected. This is the explanation given for the destruction of many a chimney constructed in accordance with sound principles of stability. The *Oesterreichische Zeitschrift für Berg und Hüttenwesen* adds to this statement the qualification that, in the case of a chimney near Vienna, 50. m. (164 feet) high, and constructed of concentric (hollow) rings, with an inner diameter at the top of 2 m. (6½ feet), which is exposed to considerable gusts of wind, the oscillations were most carefully and repeatedly measured with a theodolite, when the observations showed an extreme oscillation of only 16 cm. (6½ inches) during severe storms.

The American Well Works, of Aurora, Ill., have issued a 48-page illustrated "Treatise on Natural Gas and Oil," with illustrations and descriptions of tools and appliances. Several pages of interesting information are given regarding the discovery and properties of natural gas, together with the theories of its origin. These are followed by a full catalogue of boring appliances, including portable steam engines, artesian well rigs, oil well tools, the Hercules steam drill, hydraulic mounted revolving machines, horse-power revolving rigs, Chapman's revolving process and patent force expansion drills, hydraulic and jetting machine, pipes, fittings, &c.

Contracts for nearly 7000 tons of cast-iron water-pipe were placed by the city authorities of Chicago on the 16th ult. Six-inch pipe will be furnished by the Addyston Pipe and Steel Company, of Cincinnati, at $24.85 per ton. All other sizes will be supplied by R. D. Wood & Co., of Philadelphia, at the following rates: Eight-inch, $24.84 per ton; 12-inch, $24.70 per ton; 16-inch, $24.60 per ton; 24-inch $24.40 per ton. These prices are stated to be at least $3 per ton lower than the prices at which similar contracts were placed last year.

Representative Thomas, of Illinois, a member of the House Committee on Naval Affairs, has prepared an original design for a war vessel, which will be laid before the committee. The vessel is to be known as the pneumatic dynamite monitor. The estimated cost of the vessel is $1,500,000.

Sheffield, like Manchester, wants a canal to the sea, and can have it by expending $5,000,000 on a trench 50 miles long. A Sheffield paper says: "We have lost steel rails and ship-plates. There remain tires, wheels, axles and springs; armor plates, gun forgings, propeller blades, cranks and those mighty castings which require to be tugged by traction engines, for, if they go by rail, they want more room than Royalty itself."

THE WEEK.

The American Meat Company, just organized with their headquarters at Kansas City, Mo., are probably the most extensive company of the kind in the United States. The company have over 4,000,000 acres of land in Mexico and New Mexico, upon which they have at the present time 425,000 head of cattle. This large body of land is owned by the company in fee simple, and the company propose to go into the cattle-raising business on the widest scale. The cattle will be shipped to Kansas City, where they will be slaughtered in the large house erected for that purpose. J. H. Flagler, of Pittsburgh, through his connection with the McKeesport Tube Works, is president.

According to experiments conducted by the Health Board of New York, it appears that dry heat of even 280° is insufficient to kill disease germs, except in cases where the fabric is perfectly dry or so loosely rolled or folded that the heat can penetrate it. But by injecting live steam into the tank Dr. Edson's assistants have been able to disinfect clothing and bedding at a temperature of about 160°, and the goods come out of the tank unhurt, except that the colors in some kinds of cloth are effaced or badly mixed. The disinfection by steam is rapid and satisfactory. Iron cages are being prepared for the collection and return of bedding and clothing. Each cage has a lock to it, and the owners of clothing can keep the key while the goods are being disinfected. The work is done by the Health Department free of charge.

The labor unions of New South Wales are the ruling power. The American steamship Alameda, of the Oceanic Steamship Company, arrived at Sydney from San Francisco last month, having on board 33 Chinamen employed in the menial positions, such as shovelers and trimmers, which no American coveted. Otherwise, from the captain down, including waiters, engineers and porters, all were Americans. The amalgamated labor unions of New South Wales resolved that the Chinese must go, and accordingly the steamship officers were notified that unless the obnoxious Celestials were discharged the vessel would not be allowed to dock, land her cargo or to take new supplies of coal. While the Government authorities had under consideration measures intended for her relief, the captain so far weakened that an agreement was signed to receive on board as passengers 21 members of the seaman's union who would supersede the Chinamen on arriving at San Francisco. All other lines converging at Sydney, report said, would be similarly purged. A Sydney correspondent says: "The laboring man is the real ruler of New South Wales, and dictates terms and conditions which suit himself and which are unquestioningly acceded to. Wages here are three times what they are in London, and yet the laboring man considers himself downtrodden, and continually makes new demands." The more thoughtful of the people deprecate the unreason of the wholesale denunciation of the Chinese, and apprehend grave complications with the Chinese Government unless more consideration and moderation are exercised.

Seventeen deadly bombs of the anarchist pattern were found in the scrap-iron pile of the Swift Iron and Steel Works, near Cincinnati, where it had been gathered from various sources.

According to the new rule just enforced at all the ports of the Island of Cuba, navigation duties have been suppressed for all vessels belonging to the nations with whom Spain has a commercial treaty, and in their stead a duty of $1 for each ton of goods landed and shipped has been established. This measure considerably increases the expenses on all goods imported and exported, as will be seen hereafter. A steamer measuring 1760 tons can load 3000 tons of goods, and will pay; on goods imported, $3000; on goods exported, $3000 to $6000. Same steamer paid before, 6½ cents for each ton of measurement, $1100. Difference, $4900 more now than before.

Costa Rica has taken the initial step toward carrying into practical effect the project of a Central American confederation by decreeing that henceforth all citizens of Guatemala, Salvador, Nicaragua and Honduras shall enjoy all the rights and privileges of her own citizens when within her boundaries.

The value of imports of fruits, including cocoanuts, from the West Indies into the United States for the year ending June 30, 1888, was $5,806,687.

The deficiency in the French wheat crop has already lead to unusually heavy purchases of wheat on the Pacific coast for direct export to France.

The first tea ship from China this season made the trip to New York in 65 days.

The Barings and other well-known houses will issue in October the stock of a company with a capital of £10,000,000, formed to work a concession to supply Buenos Ayres with water.

Duties are collected on merchandise arriving from Mexico by parcels post in accordance with a convention, which went into force July 1.

The firing of Cannon in Jacksonville as a protection from yellow fever is ridiculed by the New Orleans *Times-Democrat*. The editor says: "The concussion theory is as absurd as it is old. It was tried half a century ago in the Gulf cities, and its only effect was to kill by the shock nearly all the convalescents. The Jacksonville authorities have, it is true, warned the people of the salute and advised them not to be frightened over it, but this advice cannot always be followed by persons sick of the fever, and the cannonade is only too likely to be followed by an increased death rate, without the slightest good resulting from it. And it will undoubtedly have the effect of still further increasing the panic, as in an infected town nothing tends more to spread the gloom and feeling of terror than to have the sky overclouded with smoke and the minute guns steadily firing. If this does not cause the bravest Jacksonvillian to lose his nerves, nothing will."

At the meeting of the executive committee of the American Protective Tariff League, Stephen W. Roach, of New York, was elected manager in place of Garrett Roach, deceased, and ex-Governor Hoyt, of Pennsylvania, was elected general secretary of the League, in place of Joseph D. Weeks, resigned.

A tract of 110,000 acres of coal lands in Colorado, 60 miles north of Pueblo, is said to have been bought by a number of Pennsylvania capitalists for $3,850,000. Some of the coal veins are 12 feet thick.

An invention to regulate combustion and to prevent sparks from locomotives has been patented by Robert H. Coleman, the ironmaster, of Lebanon, Pa. Report says that its value has been proven in practical tests.

Peru is suffering severely from the sudden collapse of paper money circulation. It is estimated that 60,000,000 paper sols guaranteed by the Government remain in private hands, and is practically useless, so that numbers of families in Lima and other principal cities are unable to buy the necessities of life. Consul Brent, in describing the situation, which he regarded as almost hopeless, says: "Such a blow to a nation in such financial straits as Peru is to-day is hardly conceivable abroad."

Rumors come both from Ottawa and an agent of the New Zealand Government now in San Francisco that negotiations are pending between the Australian colonies and the Canadian Pacific Railway for a line of mail steamers to Vancouver and Brisbane on the termination of direct service via San Francisco next October. Should a contract be made, which seems not improbable, the bulk of American correspondence would go through the Dominion.

The coroners jury sitting in the case of the Chrystie street fire, by which a number of persons lost their lives, find that the building law requiring fire-escapes is inadequate in their application to factories where large numbers of working people are engaged, and recommend such revision as shall afford the needed protection.

The Manhattan Club offered a round $800,000 for the Stewart mansion, without securing the property.

Austin Corbin has resorted to legal measures for the suppression of foul odors on Barren Island, where the city refuse is converted into fertilizers. He claims to have suffered to the extent of $100,000.

The acting superintendent of the Maritime Exchange, in speaking of the sinking of the ocean steamship Geiser by the collision with the Thingvalla off the coast of Novia Scotia, said: "It seems almost impossible to prevent such accidents at sea, unless the masters of vessels adopt the plan of running very slow when the weather is thick. Captains are usually anxious to make good time." The ocean lane system, the acting superintendent thought, might be to a certain extent effectual, but people who go to sea should make up their minds that there are risks which they must assume.

There is no yellow fever in any part of Florida, excepting Jacksonville, Tampa and Manatee, and it is believed that it is not now epidemic anywhere. In Jacksonville last week the victims of yellow fever numbered only three.

The materials for the repair of the damaged steamship Thingvalla, at Halifax, will be forwarded from New York and Philadelphia.

Gen. J. L. Curtis, who has been nominated for President by the American party, is President of the Franklin Steel and Zinc Company, of New Jersey, and is interested in other steel and zinc projects.

There is talk at Detroit about the possibility of the Canadian Pacific Railroad making that city one of the principal points of connection with the United States railroad system by means of a tunnel.

The rising port of Tacoma, the center of a great wheat and lumbering region, will this year ship 80 cargoes of wheat, mostly from the Palouse country, in Eastern Washington Territory.

The President of the American Paper Makers' Association has collected reliable data showing that the paper trade which stood 21st in rank among American manufactures in 1880, is now 14th, and than the capital invested has nearly doubled is the last eight years. The annual product has far more than doubled in quantity, and in spite of lower prices is 75 per cent. greater in value. The number of employees is 40,000, against 24,500 in 1880, and the wages paid are more than twice the total in the last census year. The average per day for each worker was then $1.13, and now it is $1.50.

George N. Tatham died early Sunday morning at Jenkinstown, Pa., where he was spending the summer. He had been

ill for a long time. Mr. Tatham was born in Philadelphia in 1807, and had been for many years the senior member of the firm of Tatham Brothers, manufacturers of lead pipe. Henry B. and William P. Tatham, in Philadelphia, and Charles, another brother, in business in New York, survive.

So great are the improvements made in Germany in the navigation of rivers and canals that the total tonnage of the German river fleet is only a trifle under that of her whole merchant navy, being, according to the returns for 1885, 1,242,000 tons, against 1,294,000. A good idea of the part played by river navigation in the internal commerce of Germany may be gained from observing the relative proportion of land and water freight in the commercial returns of some of the leading cities. The following table comprises some of the more striking instances:

	—Tons received—	
	By rail.	By water.
Berlin	3,504,000	3,348,000
Hamburg	1,191,000	3,221,000
Bremen	776,000	184,000
Mannheim and Ludwigshafen	1,776,000	2,041,000
Ruhrort, Duisberg and Hochfeld (ports of the Rhine)	5,427,000	4,107,000

In the cases of Hamburg and Bremen sea tonnage is, of course, excluded.

The new twin-screw steamer of the Inman Line, the City of New York, and the Cunard Line's second-best boat, the Umbria, steamed down the bay on Saturday within an hour of each other, bound over a course 2850 marine miles long, for Queenstown. It is positively affirmed that they will not race, but it is just possible, as somebody has remarked, that they "will endeavor in a humble way to see which will get there first."

It is estimated that the city of Brooklyn will this year have a population of 800,000, and that five years hence there will be fully 1,000,000 people within the present boundaries.

By the death of Charles Crocker San Franciso loses a citizen whose property was worth $40,000,000.

New York's Future.—The future of New York City is outlined by Andrew H. Green, ex-Comptroller and ex-Park Commissioner, whose offices contributed largely to the laying out of Central Park. He predicts the eventual absorption within the corporation limits of the town of Westchester, of the whole of Kings County, of Flushing, Newtown and Jamaica, in Queens County, and all of Staten Island, giving to the city an area of about 320 square miles, as compared with London with an area of 687 square miles. To effect this object Mr. Green would remove all obstacles, open ways, build bridges and make it cheap and convenient for anybody to live here. He says: "From the easternmost point of Staten Island to the northerly line of the city, being the southerly line of Yonkers, would be 32 miles. From the Battery to its extreme northerly line would be, say, 18 miles, and from the Hudson River to the easterly line of Flushing would be about 7½ miles. We cannot keep too constantly in mind that New York is and is to be the great manufacturing center of the continent. Its domestic is probably three times its foreign commerce. No impediment should be placed in the way of conveniences for continuing our hold on the great continental traffic which by all the rights of topographical advantages belongs here. The Hudson should be bridged, of course avoiding needless obstructions to the waterway. The great continental railway lines must be facilitated in establishing their terminals here. Where capitalists are willing to embark their money to open new ways to the city, to bridging and tunneling the adjacent waters, they should be encouraged, not opposed by vexatious legislation. Within a radius of 25 miles from the Battery in Jersey there are more people to-day than in Brooklyn, more than the whole State of Connecticut, and the day is not distant when the necessities of business and the convenience of administration will force a concentration of the various towns, cities and villages within this radius into one great municipality, with immense advantages for the accommodation of domestic traffic, and with excellent water facilities."

The World's Fast War Ships.

An interesting and valuable collection of statistics has just been laid before Congress, comprising the principal war vessels of all navies, classified according to speed. According to these, England has four armored and half a dozen unarmored cruisers that make 15 knots. Her armored 16-knot vessels include the Imperieuse and Warspite, of 8400 tons each; the Collingwood of 9500, the Rodney of 10,300, the Camperdown, Benbow, Anson and Howe of 10,600 each. She has building the Victoria and Sans Pareil of 10,470 tons each, and the Trafalgar and Nile of 11,940. Her six unarmored cruisers going 16 knots include four of the Leander class, 3750 tons each, while four more of the Blanche class, 1580 tons, are building. Passing to unarmored vessels of 17 knots, England has eight of the Archer class, 1770 tons, on which our gunboats of the Yorktown class are modeled. She has also the Surprise and Alacrity, 1400 tons; four vessels of the Mersey class, 4050, and the Polyphemus, 2640. Of British 18-knot vessels, the most remarkable are the armored Orlando, Undaunted, Australia, Narcissus, Galatea, Immortalité and Aurora of 5600 tons each, all but the two latter already built. The same high speed is ascribed to the well-known unarmored vessels, Iris and Mercury, 3730 tons, and to four small craft of the Grasshopper class, 525 tons. Great Britain's 19-knot vessels now building are the unarmored cruisers Melpomene, Magicienne and Marathon, 2950 tons, and the Barham and Bellona, 1800. Of 20-knot vessels, she has building the Medea and Medusa, 2800 tons; the Vulcan, 6620, and the Blake and Blenheim, 9000, besides seven small vessels of 735 tons. France has no fewer than four armored and 13 unarmored vessels of 15 knots. She has of 16 knots the armored Courbet built and the powerful Hoche, Magenta and Neptune, 10,581 tons each, now building. The unarmored Tourville and Duquesne are also 16-knot cruisers. Of 17 knots the most important vessel is the Sfax, 4480 tons, while there are four more unarmored cruisers of the Faucon class, about 1272 tons. In the 18-knot array we find the two most powerful vessels in the French navy, the armored Marceau of 10,581 tons and Brennus of 11,000. Then there is the swift unarmored Milan of 1550 tons, besides eight torpedo boats of the Bombe class, 321 tons. France of 19-knot unarmored vessels has the Forbin, 1848 tons, already built, and five others of the same class building. She has also under construction the Jean Bart, Alger and Isly of 4162 tons, the Cécille of 5766, and the Tage of 7045. She claims 20 knots for the armored vessel Dupuy de Lôme, 6297 tons, and also for the unarmored Davaust and Suchet, 3027 tons, all now building.

Italy has two big armor clads, the Duilio and Dandolo, of 15 knots, and half a dozen unarmored cruisers. She has three powerful armored vessels, the Andrea Doria, Ruggiero di Lauria, and Francesco Morisini, of 10,045 tons each, besides two unarmored cruisers, all going 16 knots. Of her three 17-knot vessels the most important is the unarmored Giovanni Bausan, 3068 tons. But it is in her 18-knot vessels that Italy is incomparable, since these include the powerful armor clads Italia, 13,898 tons, and Lepanto, 13,550, already built, and the Re Umberto, Sicilia, and Sardegna, 14,000 tons, building, besides four small unarmored vessels. Her 19-knot unarmored cruisers are four of the Vesuvio type, 3530 tons, and five of the Dogali, 2200 tons, three of these nine vessels being already built. Finally, of small 20-knot topedo craft she has nine of the Tripoli type, 741 tons, and six of the Folgore, 317 tons.

Germany has one gunboat built and half a dozen building of 15 knots. She has also the unarmored cruisers Prinz Adalbert and Leipzig, 3925 tons; the Alexandrine and Arcona, 2370 tons; the Charlotta, 3360 tons; the Freya, 2017. Of 16-knot vessels she has the unarmored Hohenzollern, 1700 tons; the Pfeil and Blitz, 1382 tons; the Ziethen, 975. She has no vessels of 17 knots, but she has under construction the Wacht of 1240 tons, which is expected to go 19 knots, and the Grief of 2000, for which 20 knots are promised. She has also three unarmored vessels building, the Irene, Princess Wilhelm, and one other, of 4400 tons each, which are to make 18 knots.

Spain has an armor clad, the Pelayo, of 9902 tons, which makes 15 knots, besides two unarmored cruisers of 3342 tons each, two others of 1152 tons, two of 1030, and four of 1055. She has none classed as 16, and none as 18-knot vessels; but of 17-knot unarmored cruisers she has the Arragon of 3342 tons, and the Reina Cristina, the Reina Mercedes, and the Alfonso XII, each of 3090. Spain is becoming famous for fast war vessels, and has under construction no fewer than six armored 19-knot cruisers of 7000 tons each, a little larger than our own Maine and Texas, of which only 17 are expected. She has also already built the famous unarmored Reina Regente of 5600 tons, making 20 knots, the fastest vessel of her class in the world. This cruiser may be practically the model for the new 20-knot unarmored vessel of 5300 tons displacement provided for in the pending House Naval Appropriation bill. Spain has also the Destructor, of 458 tons, a 20-knot vessel, and both of the Reina Regente and of the 20-knot torpedo types she is building three more vessels each.

Russia has one armored and three unarmored vessels of 15 knots, and is building three armored vessels, the Tchesma, Sinope, and Catherine II, of 10,181 tons each, to go 16 knots. She also has five middle-class ironclads, the Dmitri Donskoi, of 17 knots, and the Admiral Nachimoff, Alexander II, Nicholas I, and Pamjatz Azova of 18 knots. She has an unarmored cruiser of 19 knots, the Admiral Korniloff, and two small craft of 20 knots. Brazil has her famous Riachuelo of 16 knots and Aquidaban of 15, besides the unarmored Almirante Tamandaré of 17 knots. Chili has the renowned Esmeralda of 18 knots, and a larger vessel building of 19 knots. Austria has one armored vessel of 16 knots and one of 17, besides two unarmored cruisers of 19 knots and one of 18, with three small torpedo boats of 20. China's armored vessels include one of 15, two of 16, and one of 17 knots, while she has four unarmored cruisers of 15, four of 16, and two of 18 knots. Japan has three armor clads, the Itsukusima, Matsukusima, and Hakidati, 4140 tons each, of 16 knots, and an unarmored cruiser of the same speed, and she has three vessels of the famous Naniwa type, 3650 tons, and 18 knots.

Mr. James Skelding, manager of the Low Moor furnaces, at Low Moor, Va., died on Sunday, August 5, of dropsy of the heart, and was buried at Ironton, Ohio, on August 8.

MANUFACTURING.

Iron and Steel.

The Sharon Iron Company, of Sharon, Pa., signed the Amalgamated scale last week, and operations have been resumed in all departments.

The Lawrence Furnace Company, of Ironton, Ohio, propose to build a 30-ton coke furnace in the vicinity of their present idle charcoal furnace at Culbertson, Lawrence County.

In our issue of last week we made mention of the sale of the Coatesville Iron Works at Coatesville, Pa., to Worth Brothers of that place, for the sum of $41,050. These works were formerly known as the Viaduct Iron Works, and have recently been operated by Andrew Williams, of Plattsburgh, N. Y. The property includes over 100 acres of land upon which are four rolling mills, fully equipped, a grist and saw mill, eight double and six single tenement houses, and a number of other buildings. The mills were successfully operated for many years by Steele & Worth, and of late times have been in the hands of the Coatesville Iron Company, as whose property they were sold by the sheriff. The purchasing firm consists of J. Sharpless Worth and William P. Worth, sons of S. B. Worth, of the former firm of Steele & Worth. They now own and operate rolling mills in Coatesville, erected by themselves a few years ago, and it is their intention now to operate both these and the Viaduct Mills.

The large rolling mill of the Wheatland Iron Company, at Wheatland, Pa., owned by the Woods heirs of Pittsburgh, will soon be put in operation, after an idleness of more than ten years. The plant was built in 1872, and contains 13 double puddling furnaces, 12 heating furnaces, and three trains of rolls, and was built for the manufacture of skelp iron. The works have been idle on account of legal trouble. A new company, composed of Woods' heirs, has taken charge of the plant and will run it steadily. Bar iron will be the chief product, and nearly 300 men will be employed.

Judge Ewing, at Pittsburgh, has confirmed the sale of the mills of Graff, Bennett & Co. to James W. Friend, Jos. M. Bailey and James Richards, as trustees for the syndicate of creditors, mention of which was made in our issue of last week.

The plant of the Penn Iron Company, Limited, of Pittsburgh, was closed down for an indefinite period on Saturday, the 18th inst., on account of dullness in the iron trade. About 300 men were thrown out of employment.

The Warren Iron and Steel Company's big mill has resumed work after an idleness of five years, with the exception of a month's run last year. The 400 men go on double turn immediately.

The Warren Tube Company's plant, at Warren, Ohio, was offered for sale recently by Sheriff McKinley to satisfy a judgment obtained by creditors. No bids were received and the works will be reappraised and offered for sale again. The selling price could not be less than $77,000, which parties desiring to buy considered too high.

All departments of the plant of the Columbia Iron and Steel Company, at Uniontown, Pa., have been put on double turn in order to keep pace with the large orders which the firm have on hand.

James P. Witherow, engineer and contractor, of Pittsburgh, has received a contract for the erection of three blast furnaces for the De Bardeleben Coal and Iron Company, of Birmingham, Ala. The furnaces will be built at Bessemer about four miles from Birmingham. It is stated that the above-named firm will erect two more furnaces in the near future, and that Mr. Witherow will also build them. This large contract will keep the works of Mr. Witherow, which are located at New Castle, Pa., in operation on double turn for the balance of the year, and will give employment to about 200 men.

The employees of P. L. Kimberly & Co., Limited, proprietor of the Greenville Rolling Mills, at Greenvill, Pa., have received one-half of the back pay due them at the time of the recent shut-down. The other half will be paid in two weeks.

The Pittsburgh Steel Casting Company, of Pittsburgh, have commenced work on the castings for the new Government cruiser Maine, a contract for which work has been secured by this firm. The patterns have not all been received yet, but, it is understood, some very heavy castings will be required.

Only three firms in the country have not as yet signed the Amalgamated scale. They are: Dilworth, Porter & Co., Limited, proprietors of the Glendon Rolling Mills, Pittsburgh; Whitaker Iron Company, Wheeling, W. Va., and the Globe Rolling Mill Company, Cincinnati, Ohio. It is expected that all of the above firms will sign as soon as repairs are completed and they are ready to start their works.

Lucy Furnace No. 2, of Carnegie Bros. & Co., Limited, at Pittsburgh, was blown out on Friday, the 17th inst., for the purpose of being relined and otherwise repaired

The nail department of the Atlantic Iron Works, of P. L. Kimberly & Co., Limited, at Sharon, Pa., which has been idle for some months, resumed operations on Tuesday, the 14th inst.

The charcoal furnace of the Duluth Iron Company, at Duluth, Minn., built in 1872–73, has been definitely abandoned. It has been idle since 1883.

A dispatch from Bellefonte, Pa., under date of the 16th inst. reads as follows: "The Howard Iron Works' property has been levied on by the sheriff and is advertised to be sold on the 28th of August. The ironworks proper are situated in Howard township, near the borough of Howard. They consist of a rod wire mill, a bar mill, a muck bar mill, a machine shop, rolling mill, &c., with a charcoal furnace, 15 tenement houses, a store house, private dwelling, and all the ore and timber lands situated in Howard, Marion and Walker townships, with washing machinery, aggregating 1155 acres. The Howard Iron Works have not been in a very flourishing condition for several years. They have been owned and managed principally by Bernard Lauth, who has produced several very valuable patents, among which is the cold rolled iron process. One of Mr. Lauth's patents was a process for rolling steel plate for nails This was tried in the Bellefonte nail works, but was abandoned after a thorough trial."

The steel department and rail mill of the North Chicago Rolling Mill Company's South Chicago plant were shut down temporarily on Tuesday of last week. The blast furnaces were continued in operation. The cause of the stoppage of the rail mill was the lack of orders for immediate delivery. Work will again be resumed toward the close of the month or early in September, to roll rails for which contracts have been taken for such deliveries. In the meanwhile it is hoped that more orders will be received to insure a steady run from that time.

Winona Furnace, of the Columbus and Hocking Coal and Iron Company, in the Hocking Valley, has blown in.

The work of dismantling and removing the boilers, engine, machinery and ironwork of the Monocacy Furnace, at Monocacy, Pa., has been commenced. One nest of boilers, the engine and fly-wheel will be taken to Norway Furnace, at Bechtelsville; the large tanks and a lot of other ironwork and machinery will be sent to Pottsvile, while another nest of boilers and other portions of the plant will be shipped elsewhere.

A notice has been posted in the Penn Roiling Mill, Lancaster, stating that the finishing department will continue operations, the puddling department alone suspending.

The North Branch Steel Company, at Danville, Pa., No. 2 furnace, Mr. F. E. Bachman, manager, made during the week ending August 14 476.5 gross tons of pig iron on a fuel consumption of 1.14 tons and limestone, 0.78 tons per ton of iron. The ore mixture averaged 53.81 per cent. and the temperature of blast 855°. The best week's work of this furnace under any previous management, with identically the same equipment, was 216 tons on an ore mixture giving 51.28 per cent. iron, a gain of 121 per cent. in output to the credit of Mr. Bachman. The fuel used was one-half coke, one-quarter Schuylkill and one-quarter Kingston anthracite coal.

The Charlotte Blast Furnace, at Scottdale, Pa., which has been idle for the last year on account of trouble between the company and men over an advance in wages, which the company refused to give, is getting ready to resume operations again. The coke ovens have already been fired.

It is expected that the first forgings at the new gunshop of the Bethlehem Iron Company, at Bethlehem, will be made toward the close of this month.

A second of the furnaces of the Troy Steel and Iron Company is about to blow in, if, in fact, it is not already in blast at this writing.

The Troy Steel and Iron Company have put in new boilers at the steel mill. It is the intention to run one-half the boilers with coal and one-half with oil as fuel. It is expected that thus accurate comparative data will be gathered.

Machinery.

The Chicago Car Wheel Company, of Chicago, have made extensive improvements in their works this summer. All lifting will hereafter be done by hydraulic power. Tracks have been laid through the foundry to take the liquid metal on trucks to the molds, and afterward to convey the wheels to the annealing pits. The molds will be arranged in a straight line instead of a circle. The machinery will be run to and fro by friction. The result of these improvements is to place all the machinery under the control of the molder and helper, who will be able to perform their work with less exertion and greater expedition. A new engine has also been put in which is of sufficient power to operate the entire machinery, replacing two engines formerly used. The annealing capacity has been increased by the addition of 15 boiler iron pits to anneal without draft. N. S. Bouton, president of the company, prefers these to the draft annealing pits. He used draft pits 25 years ago, but began to use the other method 18 years ago, introducing improvements from time to time in the manner of placing them. These works have a cupola capacity for the production of 300 wheels a day, but do not usually aim to make over 250. Improvements are also being made at Bouton & Co.'s car-

wheel works at Aurora, Ill. Hydraulic lifts have been put in, and two of the molding floors are already supplied with tracks for the passage of trucks with molten metal and for the transfer of wheels to the annealing pits. At present the demand for car-wheels is not active, but the manufacturers look forward to a revival of business by next spring at the latest.

Charles Kaestner & Co., of Chicago, have recently taken a number of important contracts for machinery. They are furnishing the Keating Marble Works a new engine and boiler; the Chicago Brewing Company their entire outfit, consisting of the Kaestner patent mashing machine and grain remover, malt mill and draining reel; a 60-horse-power engine, &c.; the Curry Mfg. Company, a 72-inch lead chaser, a 2500-pound power mixer, a 30-inch lead and zinc mill with cooler, and double water-cooled japan mills.

The Bouton Foundry Company, of Chicago, are making additions to their machinery with the view of enabling them to complete all classes of work in themselves as far as possible. Among the latest machines they have purchased is a mill capable of handling pieces 16 feet in diameter and 5 feet in hight. It will bore at any angle and will turn large castings with ease.

The Harrington & King Perforating Company, of Chicago, are building up a large export trade, their business with foreign countries this year being heavier than ever before. They are shipping perforated metal to Australia, South Africa, South America, and in fact to all parts of the world in which gold mining is carried on.

The National Pneumatic Tool Company, have been incorporated at Chicago with a capital of $200,000. The incorporators are Charles D. Woolwich, Harry Hunter and John Platner.

At the annual meeting of the stockholders of the Pittsburgh Motor Company, held in the office of the company, in Pittsburgh, last week, the following officers and directors were elected: President, John E. Ridall; vice-president, James B. Scott; secretary, W. L. Eaton; treasurer, F. C. Hutchinson. Executive Committee: C. L. Magee, James B. Scott and John E. Ridall. Board of Directors: C. L. Magee, James B. Scott, H. S. A. Stewart, John E. Ridall, C C. Scaife, A. M. Neeper, John L. Blackwell and George Renault. The three last-mentioned gentlemen are residents of New York. The territory of the Pittsburgh Motor Company embraces Pennsylvania, Ohio and West Virginia. It was this company which constructed the Observatory Hill Electric Railway in Allegheny. It has no roads in course of construction at present.

The Westinghouse Air Brake Company have awarded the contract for the foundation of their large works on the Pennsylvania Railroad, near Wall's Station, and work has already commenced. The cost of this part of the structure alone is estimated at $150,000. Among the structures to be built for the company, and for the foundation of which the contract was let yesterday, are the machine shop, the foundry, the boiler house, the blacksmith shop and the shipping shop. The machine shop is to be 500 x 250 feet, the foundry 500 x 300 feet, the boiler house 160 x 80 feet, and the blacksmith shop 250 x 150 feet. A. Peebles is the architect, and when these buildings are completed ready for the machinery they will not have cost less than $850,000 or $1,000,000.

During the last six months the Union Mfg. Company, of New Britain, Conn., have added considerable new machinery, including patterns, tools, &c., to their chuck department, which is now one of the largest in the country. This firm manufacture lathe chucks in 3 to 42 inches, inclusive, and with two, three and four jaws. We also understand that they make special styles of jaws and drawings. Their chucks are used very largely in this country, and we are informed that they have had a considerable sale abroad.

The Harrison Machine Company, of Belleville, Ill., have manufactured and shipped this season 320 separators, 95 engines and 85 straw stockers.

The Southwestern Agricultural Works, A. G. Munn, president, report business good. They make specialties of saw mills, cane mills and evaporators, grain drills, cider presses, feed and straw cutters and corn shellers. Owing to excellent crop prospects the demand for some of their agricultural implements has more than doubled that of last year. Their salesmen report as an indication of prosperity through the cotton belt that the farmers have a largely increased area in corn planted, and this fact which concerns the company so closely has caused them to manufacture their goods more extensively than ever. They have this year placed several of their improved saw mills down on the South Atlantic Coast in the yellow pine belt.

Miscellaneous.

William F. Remppis & Co., of Reading, Pa., manufacturers of wrought-iron railings, fences, fire-escapes, &c., have removed to their new establishment on the river front, near the Lancaster Bridge, in that city. Another addition has just been erected, and they now have better facilities than ever for attending to their business. They are engaged at present in preparing the window grates for the Pennsylvania Trust Company's new building, and have enough orders on hand to keep their establishment busy during the coming fall and winter.

A great deal of red tape is being played out in the matter of the Louisville and Jeffersonville Bridge. The promoters of the enterprise, who believe the bridge will be a great benefit to both cities, strongly advocate a certain location connecting the centers of business of the two sides of the Ohio River. They are bitterly opposed before the War Department by the Louisville and Jeffersonville Ferry Company, who are doing a lucrative business between the cities, which the bridge would naturally interfere with. Most of the river men have sided with the ferry company in the fight, urging that the location of the piers just in the upper part of the harbor would greatly endanger the coal fleets and large boats as they "round to" preparing to go down the falls. This view should be thoroughly studied, as the Louisville harbor is a very important one, through which all boats going over the falls or down the Portland canal have to pass, and the Secretary of War is weighing the matter carefully and has given the opponents 30 days to file their protests. As Congress has already granted the right for the bridge to be built across the river, the objections now are purely as to location, the river men wanting it put in the upper ends of the cities, which would virtually kill it. Dennis Long, the venerable and successful foundryman, of Louisville, is at the head of the enterprise.

The shipowners of Nova Scotia and New Brunswick are united to secure such legislation as shall prevent the construction of more timber rafts for export.

The collapse of the strikes in Paris is due largely to the unexpected firmness of the Floquet Ministry.

The Connellsville Coke Trade.

Within the last month or so a decided improvement in the coke trade, both as regards price and demand, has taken place, and the operators in the Connellsville region are greatly encouraged with the outlook for the future. Since last March this important industry has been in a very demoralized condition, and with the low prices at which coke has been sold, it is extremely doubtful if the operators have made any money during the last six months. In January of this year coke was selling freely at $1.75 per ton, and the majority of the ovens in the region were being operated to supply the demand. In March a reduction of 25 cents per ton took place, and in the latter part of that month another fall took place, which put the selling price at $1.25 per ton, lower than it had been for years. When this low price was reached the operators claimed that there would be no further decline. In this, however, they were mistaken, as in April another decline of 25 cents per ton took place, which put the price at $1 per ton, and with a demand barely sufficient to keep half the ovens in operation The market continued in this condition till the beginning of the present month, when a decided improvement set in, and where a month ago the operators were only too glad to dispose of their product at $1 per ton, they now refuse to make contracts for future delivery at less than $1.25 per ton, and it is believed that before many days the price will have advanced to $1 50 per ton. One of the largest operators in the region, whose headquarters are at Pittsburgh, took a contract last week to furnish a number of cars each day until January 1, 1889, at $1.25 per ton. Less than a month ago there were not over 60 per cent. of the ovens in the entire Connellsville region in operation, and they were running only four days per week. At this time there are more than 75 per cent. of the ovens in operation and they are running six days per week.

The reason advanced for the improvement in this industry is the resumption of the mills in the West that were idle during the recent lockout, if it may be so called, and the blowing in of a number of idle blast furnaces, which, of course, would greatly increase the demand. In Pittsburgh and the Mahoning and Shenango valleys the mills and blast furnaces are more generally employed now than at any time this year, and the demand for coke from these sections is particularly heavy. The same is true of Wheeling and other points in the Ohio Valley, where the demand for coke at the present time is very large. In connection with the improvement in the condition of this industry comes the report that an attempt will soon be made to form another coke syndicate, and that steps have already been taken looking to the consummation of this object. To this report, however, but little significance is attached by those familiar with the trade. During the early part of the year, when attempts were being made to revive the old syndicate, it was pointed out that success depended upon including all the large operators, and that would be necessary to-day. One of the largest firms in the region, who were charged by the other operators with being the cause of the disruption of the old association, have absolutely refused to support any attempt made to form a new syndicate, and for this reason we repeat our statement that without united action all attempts will go for naught. The reason advanced by this firm for their refusal is that the old syndicate has refused to pay to them a large amount of money on account of contracts taken for coke at a low price. Until a settlement is made with this firm and their co-operation is secured it will be impossible to form a coke syndicate.

The Iron Age

New York, Thursday, August 23, 1888.

DAVID WILLIAMS, - - - PUBLISHER AND PROPRIETOR.
CHAS. KIRCHHOFF, JR., - EDITOR.
GEO. W. COPE, - - - ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS, - - HARDWARE EDITOR.
JOHN S. KING, - - - - BUSINESS MANAGER.

The Iron Age Index.

A complete Index for Volume XLI, January to June, 1888, is now ready. Subscribers desiring to have a copy should apply early, as only a limited number have been printed.

Heavy Ordnance for Fortifications.

A perplexing struggle has been going on in both Houses of Congress, during the past week, over the legislation which is to provide for heavy ordnance for the army. Briefly stated, the course of events during the present session has been as follows: The House framed an army appropriation bill providing for funds for the usual routine expenditures, to which the Senate added $5,000,000 for rough steel gun forgings for heavy ordnance, and $750,000 for providing machinery and equipment at the Watervliet Arsenal to assemble the parts of heavy guns and finish them. The House declined to concur in the Senate amendments, and some discussion accompanied by attempts to delay action grew out of the question whether the Military Committee or the Appropriation Committee should represent the House in the conference. The former carried the day, and the representatives of both Houses quickly agreed upon a compromise. It simply appropriates $3,500,000 for steel forgings for guns, a reduction of the sum originally proposed of $1,500,000. No caliber is specified, nor are any further expenditures in later years planned. The point was debated at some length whether such a sum would be sufficient to secure to the Government the benefits of competition among private manufacturers, and objection was raised to the fact that the bill confines army officers to the purchase of built-up guns—that they have no discretion to take any other method. The conference cut down the appropriation for the Watervliet Arsenal, at Troy, to $700,000, and in that form passed the Senate, the House not having voted on it as yet.

In the meantime the House has passed a far more elaborate bill, under the title of the Fortifications bill. It embodies a far more comprehensive plan of providing for the defense of the country by calling for not less than fifty 12-inch, twenty 14-inch and twenty 16-inch breech-loading steel guns, for not less than thirty 12-inch breech-loading cast-iron guns, and not less than fifty 12-inch cast-iron mortars. The time estimated in order to complete and test five experimental guns is 4, 4½ and 5 years respectively for the steel guns and for the other ordnance 20 and 16 months respectively. The steel guns, it is believed, can be completed in 10 years for the smaller calibers, 11 years for the larger guns and 13 years for the 14-inch guns. It will be observed that the bill especially takes into consideration the views of those who insist that iron guns are a weapon serviceable under modern conditions of warfare.

The estimated cost of the contracts may, according to the promoters of the bill, reach $13,255,433, proportioned as follows: For the purchase of steel guns, $8,804,980; cast-iron guns, $750,000; mortars, $300,000; gun carriages, $3,446,457, and mortar carriages, $350,000. No contract is to be made which will require an expenditure exceeding, in the aggregate, the sum of $13,255,433, nor an expenditure in any one year, greater than $2,500,000, the present appropriation made being $2,477,670. A special board is to carry out the work of providing the heavy ordnance, consisting of three officers of the army and three civilian, engineers, of whom at least one must be experienced in "the quality and working of steel." These civilian members of the board are to receive a salary of $5000 per annum.

An important provision in the bill is that "no money shall be expended except for steel accepted and delivered, and no contract shall be made for gun steel at a greater average price per pound for each caliber than the lowest average price charged under contracts hitherto made by the Government for forgings of like caliber." The idea underlying this provision appears to have been that since steel has been growing cheaper during the last 20 years, therefore in the future successive bids must be as low, if not lower. There seems to be a great though unfounded dread that there will be no competition for Government gun-steel contracts. It was distinctly and emphatically stated by some of the opponents of the bill that the Bethlehem Iron Company will demand whatever price it chooses to name, and that the Government will be practically helpless. The critics alluded to did not even know that the Midvale Steel Company have made a considerable number of forgings of large caliber, and that the Cambria Iron Company have taken some contracts. We believe that with the adoption of a comprehensive plan for fortifications, giving steel makers a reasonable assurance that the demand for heavy guns will not collapse after a year's spurt of generosity, more than one responsible concern will be found willing and anxious to engage in the work or to extend present facilities. The House fortification bill holds out the promise of such inducements, which, coupled with the requirements of the navy, would insure to both arms of the service an ample supply of the best material.

The Fortification bill has passed the House. It remains to be seen whether it will carry the day over the conference compromise accepted by the Senate.

A good many newspapers continue persistently to speak of a number of "trusts" in the iron trade. When at any time during the past year any report reached the daily press that a trust had been formed in any department of the trade, the industrious compilers of trust literature added one to their little list. The result is startling, to say the least. Sanguine nail-makers have been talking of arranging a combination for many months past. Plan after plan has been suggested only to fail, cut nails in the meantime selling at $1 75 to $1.85 at mill, East or West. Competition of the livliest kind has kept values down to the unremunerative figures mentioned, and yet the opponents of "trusts" are serenely carrying along the nail trust among the catalogue of iniquitous monopolies. Lead is another one of the articles afflicted with the reputation of being under the control of a trust. It acquired it from the fact that a smelter in New Mexico, a refiner in St. Louis and a manufacturer in the same place pooled their issues. That operation was merely a consolidation of interests, and together they do not handle 3 per cent. of the whole output of the metal. Competition among producers and refiners of the metal is as keen as it is among the New York dailies, and the only shadow of a trust in the trade is the persistency of the leading speculator in the metal in trying to hold it up in spite of growing production and a stagnant demand. Another representative "trust" is that in copper. A clique of French operators believe that they can corner the supply of the world for three years to come, and have bought the output of the leading mines in all countries, among them those of this country. Their trust in the future is generally regarded as sublime, but no one knowing the facts could very well indicate how such a gamble can be compared to what is ordinarily known as a trust.

The Manufacture of Tin Plate.

A short time since we gave place in our columns to a suggestion on the tin-plate question which has provoked considerable discussion. This was expected, and it would have been a disappointment if no notice had been attracted by the novel proposition which was set forth. There are many persons connected with the iron trade who think it nearly time that the tin-plate problem was seriously taken in hand, and they believe that the sheet-iron manufacturers are the people who should do it. These gentlemen approve the suggestion that was made. Others, however, viewing the matter in what they term a pure business light, see no opportunity for an immediate return on the investment which would be necessary, and they therefore oppose it. The adverse criticisms which have been made have often been quite amusing, their authors seeing in this subject a wide field for the display of facetiousness. Their humor is appreciated, but in this particular case it seems to be misapplied, as the various interests involved are of too great importance to be be trifled with.

The proposed method of attempting to establish a tin-plate industry in this country, by the erection and operation of works built by the united subscriptions of sheet-iron and galvanized-iron manufacturers, has not been put forth by its advocates because they expect to create a lucrative investment for idle or unproductive capital. As we understand it, the suggestion has been made primarily in the interest of the sheet-iron trade of the country. If the manufacturers of fine sheet iron speak with a full knowledge of the subject, and they should certainly be able to do so, their prosperity and the regular employment of their workmen at good wages would be seriously interfered with if tin plate should

be put upon the free list. As they would suffer most, it would seem to rest with them to institute vigorous measures of defense.

This is not a question of "fairness," which Mr. Cronemeyer calls up in his communication on the subject in another part of this issue. Unfortunately, our tariff laws are not constructed so as to treat all interests fairly. They never have been and probably never will be. Mere verbal argument and demonstations on paper are apparently no nearer accomplishing the establishment of an American tin-plate industry than they were five years or ten years since. It is urged that the question now before the sheet-iron manufacturers is how shall the practical difficulties of the situation be met? "It is a condition not a theory" that confronts them, and it should be met in a practical way. It is not a question of philanthropy but pure business. Those who favor the suggestion argue that the sheet-iron manufacturers would risk five dollars to save probably twenty-five.

Appeals to Congress for an increased duty on tin plates have been made for years without success. The great possible benefits of such a policy to the trade of the country at large have been set forth in as vigorous language as it was possible to command. The answer has been steadily made by members of Congress that there is no tin-plate industry in this country, and that it would be an absurdity to double the duty on an article which must be imported, especially when the national Treasury is gorged with surplus revenues. When told that increased duties would create the industry they are ready with the reply that they must first be convinced that tin plates of good quality can be made here. The experience of the small works in existence 12 to 14 years since is too old to use with effect now. Hence arises the suggestion, put forward almost as a forlorn hope, that a practical demonstration should be given of the ability of Americans to produce tin plate, and the rate at which it could be made when paying the prevailing prices for labor.

The movement in favor of free tin plates is continually gaining in strength, and every month adds to it that sees no step being taken by American manufacturers to establish the industry here. Many persons who class themselves as protectionists are now in favor of free tin plates, as they claim that the question of protection is not involved in the present discussion of the duty on this article. The duty of 1 cent per pound may not be sufficient to entirely cover the difference in the cost of manufacture here and abroad, but it certainly goes much further than no duty whatever. The strongest argument now made in favor of the abolition of the entire duty is that it has existed for years without contributing to the establishment of a single tin-plate works in this country, and it is regarded by consumers as an altogether unnecessary tax on them. They take no account of the indirect effect this duty has on the sheet-iron trade, or if they do understand it they choose to completely ignore it. The manufacturers of fine sheet iron are even now well aware that for stamping purposes a large part of their product is being displaced by tin plate, which can be had at a lower price. If the duty on tin plate should be entirely removed they would be affected very much more severely; and once off it would only be restored under the stress of some great public convulsion like our late civil war. It is urged that they should "carry the war into Africa" and retaliate on the foreign tin-plate manufacturers, and it is insisted that it would be folly to postpone action until after tin plate has been made free.

Brazil Since the Act of Enfranchisement.

It is fortunate for Brazil that Dom Pedro II recovered his health and is now on his homeward voyage, as his conciliatory spirit is likely to prevail, and the planters will receive some sort of compensation for the sudden loss of their slaves by the law of May 13. Baron de Cotegipe's bill to give the ex-slave owners 200,000,000 milreis compensation, or $104,000,000 American gold, received its quietus on July 18 last, the Senate throwing it out by a vote of 29 to 13. This was a foregone conclusion, and, in fact, the efforts of its supporters to provoke a debate, or at least to postpone the *coup de grâce* until later in the session, only served to manifest that the refusal of the planters to listen in former years to any proposal to fix a definite date for ending slavery had completely alienated the great majority of the Senate. It created the feeling that in losing all the planters had but received their deserts. As in the Chamber of Deputies the same feeling is also largely prevalent, the Government measures for the relief of planters, by furnishing them with money at 6 per cent. interest, are met with active hostility, so that on July 21 the bill for establishing mortgage banks with 5 per cent. guarantee on their issues had only arrived at the second reading of the second clause. The Government, indeed, is just now between the proverbial two stools—the abolitionists are bitterly opposed to any favor to the planters, while the latter look upon the proposal to lend them money on mortgage as a veritable insult to men claiming to be ruined by what they consider an iniquitous law. Republican meetings, are, therefore, the order of the day.

Whether and to what extent labor on the plantations will be disorganized time will show. Before the act of emancipation was passed there was a tendency on the part of slaves in the coffee districts to leave the estates by hundreds, and take to the mountains, in a good many localities. This was during last winter and spring; now that they are free we hear of no disorders of any kind so far, and the large coffee crop is being brought under shelter without difficulty or delay. Most of the coffee planters themselves, to tell the truth, have grown rich during the last three years; if last year's crop showed a great deficit, the price obtained compensated for it, and as for the sugar planters, the prices the crop now beginning to be marketed is likely to bring will be higher than they have obtained during half a dozen seasons in succession. At no time since September, 1871, when the first steps toward abolition were taken, were Brazilian coffee and sugar planters in better position to face this sudden loss than at present, and, as Dom Pedro II stands above the contending parties, he will not find it a very difficult task to bring about a compromise, and thereby remove the danger of revolution upsetting his monarchy.

The new coffee crop now beginning to arrive on our shores is estimated at 5,000,000 bags Rio and 2,500,000 Santos.

The shipments during the previous four crop years from Rio and Santos, taken together, were as follows, in bags of 60 kg., July 1 to June 30:

	1887-88.	1886-87.	1885-86.	1884-85.
To Europe	1,288,900	3,053,083	2,162,084	2,926,567
To the United States	1,715,217	2,582,617	2,897,400	3,003,433
To oth'r countries	108,050	134,033	125,000	141,667
Totals	3,112,167	5,769,733	5,184,484	6,071,667

Sugar crop prospects are fair. The shipments from the last crop, drawing to a close with the month of June, were as follows from Pernambuco up to July 7:

	1887-88. Tons.	1886-87. Tons.	1885-86. Tons.
To Europe	58,245	12,108	13,349
" the United States	69,329	54,482	46,740
" South America	38,140	68,051	29,415
Totals	165,714	134,641	89,504

The central sugar house system seems to work so well at Pernambuco and Bahia that Brazilian sugar crops are assuming larger proportions year after year, provided the canes get rain enough.

India-rubber, next in importance, shows no falling off in production; on the contrary, it is on the increase. In 1886-87 the export from Para was 13,390 tons, being 390 tons in excess of that in 1885-86. This year the demand is greater than ever, and high prices prevail. The United States take about half of what the Amazon Valley turns out. Our import of india-rubber during the fiscal year ended June 30, three-quarters of which was Para, direct or via Liverpool, was as follows:

	1888. Pounds.	1887. Pounds.
Imports	36,628,351	28,649,446
Re-export	377,731	638,317
Net import	36,250,620	28,011,129
Increase		8,239,491

This is an increase of about 30 per cent.

Hides have risen 1½ cents in our market in a little over a month. We received from Rio Grande do Sul last year at New York alone 68,836, against 82,639 in 1886 and 106,252 in 1885. There is, indeed, hardly a Brazilian product not in good position to-day. This will assist in smoothing matters in the Empire; it will improve the finances which are recently more flourishing than they have been for ten years past, and so is the exchange on London, now as high as 26¼ pence per milreis.

Our export to Brazil is likely to be large this year, especially that of flour. During the calendar year 1887 we exported to that country domestic merchandise to the amount of $7,103,845, against $7,477,466 in 1886, while we imported thence $56,377,719 worth of products, as compared with $43,266,477 the year before, the great increase being due to the advance in coffee.

We believe that since 1872 and 1873—when coffee was high—Brazil has not been flourishing to the same degree as it has done since 1885. To have at length got rid of the slavery problem is as much a blessing to Brazil as it has proved to Cuba, and the former has at least the advantage over the latter that in the coffee regions white men can work. Perceiving this the planters are procuring agriculturists from

the north of Spain and other suitable localities, and in this manner disorganization of labor of a serious kind may be avoided.

CORRESPONDENCE.

Undervaluation of Steel Blooms.

CHARLEROI, BELGIUM, August 10, 1888.

To the Editor: I see to-day only that in *The Iron Age* of the 5th of July last you published, under the heading "Undervalued Steel Blooms," an article quite contrary to the truth, and against which I must protest at once. As all the matter in question depends now on a lawsuit which I instituted here and in your country against the parties named I cannot discuss in your newspaper all the facts you describe, but I can already tell you that I am suing the calumniators, claiming $50,000 damage for their false reports.

I have no profit to undervalue any steel blooms, as I always sold any steel blooms f.o.b. Antwerp, and "the risk of duties is for account of buyers," as usually done in the steel business and often reported in your own newspaper. No European seller, unless he is an inexperienced man, would do otherwise with your ad valorem system of duties, like those on the steel products, which pay 45 per cent. on the value declared. The best proof of it is your own report in *The Iron Age* of December, 1887, as follows: "At the port of New York during the past fiscal year there were 14,050 invoices upon which additions were made by importers, and 17,805 invoices were advanced by appraiser. The amount of such advances upon the principal articles subject to ad valorem duties was $2,658,306." Is it reasonable to say that New York importers of the principal articles subject to ad valorem duties defrauded your Custom House 31,855 times? Not at all, but it is a proof that your system of ad valorem duties is quite defective.

I request you to publish the present letter in the next number of *The Iron Age* with the same paging and the same text which you used against me in yours of July 5. ANDRIS-JOCHAMS.

[We make room for the letter of our correspondent, although it does not touch the questions at issue. We may state, however, that he is in error when he asserts that steel blooms, or any other forms of steel upon which there is a duty of 45 per cent. ad valorem, are usually bought with the proviso that the risk of duties is for account of buyer. Excluding exceptional circumstances, foreign steel is sold at a fixed price, the importer taking the entire risk.—EDITOR.]

The Duty on Tin Plates.

PITTSBURGH, PA., August 14, 1888.

To the Editor: Although I well remember the advice you gave me some six years ago, when you had for awhile the kindness to publish my correspondence relating to the tin and terne plate industry, I now take the liberty to once more request you to allow me to say something on this subject to your readers. I am induced to do this by the urgent solicitation of many friends.

Your advice at the time mentioned was that inasmuch as the tin-plate question had been reviewed in all its phases it did not appear necessary to continue an elaborate discussion of the subject, and as your admirable invention of a table of quality classification seemed to remedy to some extent the most serious evils from which workers in tin and terne plates were then suffering, I heeded your advice and kept quiet on that "hobby of mine," as some of our correspondents were pleased to call it, to see what effect your plans and suggestions would have; but in the meantime I have not kept my eyes closed, but have made use of the opportunities which have presented themselves to me to make some personal observations and investigations regarding the tin and terne plate industry in England and Germany as well as in America.

And now, when after the lapse of six years the same complaints as before (pinholes, unreliable coating and tenacity, &c.) are heard, and when our company almost daily receive inquiries whether we cannot furnish such plates as we used to in years gone by, and we still continually furnish iron and soft steel sheets to customers who have tinning establishments of their own, to be used in the manufacture of such tinned goods as they must sell under guarantee, I believe a rehearsal of what was said in those times will not be without interest to your readers.

In that editorial you allude to the suggestion that the sheet-iron manufacturers (they being the most interested parties) should demonstrate the feasibility of manufacturing tin and terne plates in this country at their own expense. Now, Mr. Editor, do you really think that is fair, when you can certainly find by referring to your own columns that such demonstration has been made over and over?

You have published in the long ago a whole series of testimonials to the good qualities of tin and terne plates made in this country; you have published comparative items of cost in Wales and here, and a great deal more information can be found in the records of Congress, and now to demand, after all that has been said and demonstrated, to do this thing over again is, in my opinion, not fair. In 1873 three companies, induced by the then very high prices of imported tin and terne plates, and under the mistaken belief that the law which provided that "tin plates, or iron coated or galvanized with any other metal, should pay duty at 2¼ cents per pound" was justly enforced, started tin-plate works, and for a while operated successfully, until English manufacturers, having become alarmed, reduced, and, under an erroneous Treasury Department decision, were enabled to reduce the prices to such a figure that our home manufacturers were forced out of the market.

Yet to-day, while the prices of tin and terne plates have ruled comparatively low since then, there is still left a nice little profit for the English manufacturers, their carriers and middlemen, which amounts to just about the additional duty we ask for. I have compiled and before me now a table comparing the cost at which tin plates can be manufactured with the established prices of labor in Wales and in Pennsylvania. The calculation is based on a box of IC, 14 x 20, of medium charcoal quality, such as are being quoted at from $5.25 to $5.50 per box in New York, and the totals show that such plates can be produced at prices for labor paid in South Wales at $3.37; at prices paid for labor in Pittsburgh, Pa., at $5.25. Allow the manufacturers in either place a margin for profit and risks of 8 per cent, and the comparison will show $3.63 for Wales to $5.67 for Pittsburgh, and then allow the home manufacturer another small margin for the incidents and accidents which accompany the establishment of any new enterprise, and for the possibility that the foreigners may be able to find means to further reduce their cost, and our demand for a duty of $2\frac{2}{10}$ cents per pound will not appear unreasonable. I could give you this table for publication, but in the first place it is a very long one, and, second, it goes against my sense of business methods to publish the detailed items of cost of any article, because the majority of the readers are not supposed to understand these details; and it would necessitate such a long explanation that it would require a whole book to make it. However, the figures are open to any investigating committee of legislators or economists who will be willing to listen to explanations.

Of course I realize that likely my assertions will be denied or misconstrued by interested opponents (to them it is useless to talk), but to those who are in honest doubt in regard to the most expedient course to be pursued in this matter, and especially to your correspondent, Mr. Wilkins Trick, who coincides with your views, that the sheet-iron manufacturers ought to put up the money to demonstrate the necessity of increased tariff, I would put the question whether Mr. Wilkins Trick himself has not demonstrated this point with his and his friends' money; for he certainly would not have quit making tin plates at his establishment at Hubbard, Ohio, if he had found that such was profitable under existing circumstances.

We gave Mr. Trick our sad experience before he started, and we told him that an advance of from 25 to 50 per cent. over the wages paid in Wales would not make adequate wages for American iron workers, and that he had to calculate on at least 100 per cent. to be safe, but he thought he knew better and did not profit by the experience we had gained about seven or eight years before him. Now, if four firms have demonstrated that tin plates and terne plates can be made in this country satisfactorily, as far as quality is concerned, but have also demonstrated that, for want of protection, the foreign manufacturers are in the position to sell at our cost, or from 2 to 3 per cent. below it, they reaping at same time a profit of from 15 to 20 per cent. on their sales, and when Mr. Trick, as well as ourselves and several other American citizens, can produce convincing facts and figures to our legislators, why should the sheet-iron manufacturers, or some of them, put up the money, simply to suffer this *British monopoly* to be continued on our shores? Business is not carried on for the sake of pure philanthropy. When we, and likely any other manufacturers, go into the business of manufacturing tin and terne plates again we will do so with the prospect and intention of establishing a business which will be remunerative to ourselves as well as bring prosperity and wealth to the community and the country we live in. I do not only deem it preposterous to ask a few individuals to sacrifice their earnings, but think it is the solemn duty of our government to thoroughly investigate this question and to foster the industry.

As citizens of a free country, where equity and justice are, or ought to be, the first principle of government, we ask for equity and justice to American capital and labor. Grant us this and this only, and with American ingenuity and skill we will defy the world. The very fact that the tin-plate industry has not been granted protection, in harmony with the prevailing policy of the American people, has become a matter of ridicule and contempt on the other side of the ocean, and yet some hidden influences have so far always induced our legislators to legislate in favor of a foreign tin-plate industry rather than for an American one. This is certainly the time to ask for a change, and we do not call upon Jupiter to pull us out of a hole as Mr. Trick pleases to term it, but we shall and do call upon a power in which we have more faith than in Jupiter, and that is the vote of the American people.

But let me give yet a few figures showing how a law protecting the American tin and terne plate industry by a duty of $2\frac{2}{10}$ cents per pound would operate. As said above, with the rate of English wages a box of tin plates can be produced at $3.37; the average selling price in New

York is $5.37, showing a margin of $2 per box; $1.05 of this goes into the Treasury of the United States; 95 cents go to foreign producers and their agents. The consumption in the United States of foreign-made tin plates has now grown to about 6,500,000 boxes, consequently we pay to foreigners an annual and actual tax of $6,275,000.

Give us the rate of duty of $2\frac{2}{10}$ cents per pound, or $2.30 per box of 105 pounds, and the American manufacturer will be able to obtain about $5.67 per box, which price would include his cost and a margin of 8 per cent. I will admit that this is about 30 cents per box more than the present selling price; but can anybody guarantee that if legislation were adverse to us, and all possibillity of an American tin-plate industry were removed, the foreign manufacturers would not increase their prices to the same extent and more? They certainly did get much more than present prices from us before. But take the 30 cents per box and add it to the aggregate we now pay foreigners and you will have $8,225,000—but this amount is not sent out of the country, but remains right here in the United States family as it were—and I would ask any farmers, mechanics or professional men whether they would not rather pay a member of their family, for whom they have to provide a living any way, $8 for a certain amount of work than to have the same work performed by an outsider for $6 while the member of the family is kept in idleness? But then, further, not only this difference between English cost and American selling prices would remain in the country, but the $22,000,000 of the English cost also—keeping in circulation at home a total of $30,000,000 annually, which, occupied in turning the ore, coal, limestone, &c., in our hills into merchandise, and in carrying and transporting the same over the country, would actively keep employed over 100,000 people: and these in turn would give employment to another large number of farmers, butchers, grocers, tailors, shoemakers, builders, &c., to keep them in provisions, meat, clothing, shoes, &c.; the latter again would be consumers of the products of our industries; and so it would go on, *ad infinitum*, until a city of the size of Pittsburgh would hardly be large enough to hold all the people who had thus been provided with honorable, decent means of living. I could go on demonstrating further, but presume this is enough for to-day. With your permission I will address you some other time.

Yours respectfully,

W. C. CRONEMEYER, Chairman,
U. S. Iron and Tin Plate Co., Limited.

Gatling's Cast Steel Gun.—Dr. Gatling has invented a new steel gun which he claims will be far superior to the built-up gun, and can be made at half the cost. Speaking more definitely, he says: "My patents consist of making guns cast from the highest grade of steel to shape around a central core. This central core is utilized for the purpose of cooling the casting from the interior while the exterior is still hot. The cooling process thus begins from the interior and works out, directly the reverse of the ordinary way. This is one of my central ideas, and the results are of the greatest importance. The metal is forced, as it were, from the interior outwardly, thereby avoiding the creation of a hard, resisting arch on the exterior of the casting, at which point the full intensity of the high power force exercised by the exploding ingredients within the gun exerts itself. It makes the interior of the gun, where the greatest strain is felt, the toughest and hardest part, and the soft and spongiest part the exterior, which thus acts somewhat after the manner of a cushion. This is directly the reverse of the old style guns, in which the spongiest part is on the interior. This defect cannot be remedied in a gun made by boring a solid steel ingot, for there, although the very softest portion is bored out, still the hard resisting arch is on the outside, which becomes gradually softer toward the interior. Another important point is the method in which the metal is cast. A revolving motion is given it which makes the grain spiral."

Washington News.

(*From Our Regular Correspondent.*)

WASHINGTON, D. C., August 21, 1888.

The Senate Sub-Committee on Finance did not bring their bill before the general committee to-day, nor do they intend to for awhile. It will not be reported to the Senate until all the business pending there has been disposed of. It has come to their attention that the President is waiting for their bill, in order to make some references to it in his letter of acceptance of the St. Louis nomination. As there is no immediate urgency in getting the bill before the Senate, the committee have decided not to be in haste.

A deputation consisting of E. P. Williams, U. S. Tin Plate Company; Alfred Marshall, of Marshall Brothers; and Charles Gilpin, appeared before the Senate Committee to-day in favor of placing a duty on tin plate which will be protective. The importations last year, it was shown, footed upward of 300,000,000 pounds, and this year the amount will be greater. It was shown that this would consume a certain amount of pig iron, in the elementary processes and sheet iron in the advanced stages, and give employment to fully 30,000 more workers. They showed that free trade would not reduce prices, but in time would increase it, and cited block tin, which is free and controlled by the Dutch, as having increased within a short time fully 100 per cent. in price. They also showed that there was outrageous evasion of duty. Sheet iron with a thin coating of tin is now brought in as tin plate, which was never contemplated in the law. The deputation made a good impression, and their arguments found an appreciative audience. Whether the committee, in the face of an election, will be prepared to reduce revenue by increasing the duties, which is the only effective way short of free list of reaching that result, remains to be seen. The Randall bill adopted this course, putting the duty on tin plate at 2 cents a pound. The Mills bill made it free. It is now the Senate committee's turn to say what they will do.

TARIFF REVISION IN SWEDEN.

The people of Sweden have been having a campaign on protection, and have succeeded in getting into power in the Swedish Diet. They have made many radical changes in the customs duties of the kingdom, and have fairly embarked on a protection line. On July 1, 1888, the new revised tariff went into operation.

The rates are given in kroner, 1 kroner being equal to $0.268, and öre, 100 öre making 1 kroner. The following are the articles in the schedule of metals upon which the duty has been increased, giving the old and new rates on the same articles:

	Old rate. Kroner.	New rate. Kroner.
Iron and steel, pig and cast, per 100 kg	....	2.00
Iron beam, angle, &c., weighing less than 50 kg. per meter, per 100 kg	....	2.50
Iron rolled and wrought bar, &c., per 100 kg	....	2.50
Iron railroad fish-plates, bolts and spikes, per 100 kg	....	6.00
Iron plate, roller or wrought, of 3 mm. or over thick, per 100 kg	....	3.00
Iron plate, roller or wrought, of less than 3 mm. thick, per 100 kg	....	4.00
Iron plate, roller or wrought, ground, polished or galvanized, per 100 kg	....	6.00
Iron anchors, &c., per 100 kg	....	4.00
Iron chains, 25 mm. or over in diameter, per 100 kg	....	3.50
Iron chains, 6 to 25 mm. in diamter, per 100 kg	....	7.00
Iron spikes and nails, 45 mm. or over in diameter, per kilogram	0.03	0.04
Iron screws, 75 mm. or over in diameter, per kilogram	....	0.20
Iron screws, less than 75 mm. in diameter, per kilogram	....	0.30
Iron railroad materials not specified, per 100 kroners	....	10.00
Wire, iron and steel, 1½ mm. and over thick, per kilogram	....	0.04
Wire, iron and steel, less than 1½ mm. thick, per kilogram	....	0.08

THE SWISS PATENT LAW.

The Republic of Switzerland has passed a law for the protection of inventions, thus following in the wake of other nations. The final disposition of the question, however, as to whether the law shall be operative or not, will first require the petitions of 30,000 voters asking its submission to the people. That point gained, the law must then be submitted to a vote and be approved by a majority. It is not stated whether the Swiss Government has a patent on this method of giving a law force. It will take three months to carry out this rigmarole. Material objects and not processes are protected. It is said that "this feature is due to the efforts of the manufacturers of aniline colors and chemicals, whose interests would be injuriously affected by a law as comprehensive as that of the United States, which protects 'useful arts' and 'compositions of matter,' as well as tools and machines."

The Chartiers Valley Gas Company.

In a very interesting report by George E. Mann, city engineer of Buffalo, growing out of the natural gas explosion in St. Paul's Church, in that city, an account is given of a visit to the Chartiers Valley Gas Company, of Pittsburgh. At the wells the connection with the main line is made in the following manner: The casing that is put in the well at the time of drilling to wall out water from the rock seams extends up to the derrick floor, a branch is bolted to this casing, having one of its outlets pointing straight up the derrick and the other going off at the side at an angle of 45°. Upon each of these outlets, which are 6 inches in diameter, a gate valve is bolted, the gate valve on the upright branch having a pipe bolted to it to conduct the gas to the top of the derrick in case it is necessary to blow off the gas. From the valve on the branch pipe a curved pipe is bolted, which leads into a tank placed near the well to separate and collect any water or oil that may be carried along with the gas as it leaves the well. A safety valve is placed on top of the tank. All the fittings used about the wells are enormously heavy, so as to withstand the great pressure of the well when shut in. The first line laid was 8 inches in diameter, wrought iron screwed joints. In 1885 a second 8-inch line was laid from the Murrysville field, a line 6 inches larger than any line laid from any gas field. The following season this company laid a 12-inch wrought pipe line from the new Glenfield gas field. These three different gas fields are in different directions from Pittsburgh and Alleghény City and about equidistant, being about 16 miles. The largest line in the world for conveying natural gas was laid by this company and finished last October. It runs from the northern Murrysville gas field to Pittsburgh, a distance of about 20 miles. The first 8 miles, beginning at the wells, is 16 inches in diameter. It is then increased to 20 inches for a distance of 6 miles; at the end of the 20-inch a 24-inch begins, and extends 5 miles through the city. The pipes are, excepting the 24-inch, of wrought iron,

welded seams and converse patent joints, the largest lap welded pipe ever made.

The Chartiers company have a total of 479,258 feet of high pressure lines. As the gas passes through the city it enters regulating stations, where the pressure is reduced, a higher pressure being carried on the lines from the wells to the city than within the city. From 15 to 20 pounds per square inch is the pressure within the city on the so-called mill supply line. It is located principally along the Allegheny River near the shore, where all the large mills are located. It crosses the Monongahela river by six 10-inch lines, and is connected into the South Side mill supply system; on this side of the river are also reducing stations; the total number of feet of high pressure or mill supply lines in Pittsburgh and Allegheny owned and operated by this company is 148,693. These lines are ventilated with what is known as the "patent separate pipe escape system." It consists in placing a sleeve over every joint in the gas line; this sleeve is made perfectly gas tight around the pipe by means of lead or other suitable materials; on the inside of the sleeve a space or chamber is left where all the gas that escapes from the joint is collected; connected with this chamber at the top a small pipe leads off and up to a lamp-post at the curb line. The escape-pipe that leads away from the joint is marked with a corresponding number at the top of the lamp-post, so if gas is discovered escaping, by noting the number of the small pipe through which it escapes the exact location of the leak can be determined, as each joint in the main line is numbered, and its exact distance measured from the lamp-post. In addition to the above system the top of the pipes are covered with broken stone to a hight of 9 inches also on the branch lines to the lamp-posts. Over the broken stone is laid a sheet of tar paper, and the earth filled in on top. by this means if any gas should escape from defective joints or the body of the pipe, it will follow this blind drain and up the lamp-post to the open air.

The house supply system of this company is the same as in operation here in Buffalo—that is, large mains and low pressure rather than high pressure and small mains. On this point Mr. Hartupee says: The Chartiers company lay pipes to supply the private houses so large that a pressure of 4 or 5 ounces only need be and is carried in them. The service-pipes are then run direct into the consumer's house, no regulating or other device being necessary, as the pipes themselves carry no greater pressure than is required in the houses. The question may be asked, "Are not the valves that control the pressure between the mill and the house supply lines liable to get out of order and let a higher pressure into the house than would be safe?" We answer, "Yes, but of these valves there are in the two cities but eight, and perhaps will be never more than 12, and to watch them the company keep watchmen night and day, whose duty it is to see that these valves are always in order. In the Buffalo system there is attached to these valves a safety device on the principle of a gasometer, further mention of which is made in this report.

"Now, in the first system there are valves designed for the same purpose used between the mill and the house-supplying lines which we grant can be kept in order, the same as our company keep theirs; but in addition to this there are thousands of these same kind of valves scattered in cellars and out-of-the-way corners all over the two cities, and few persons would say that these thousands of valves can be examined every day as they should be to be certain that they will work when called upon. Our company have 20 miles of house-supply lines in the city of Pittsburgh and eight miles in Allegheny. We have over 100 miles of private wire for telephone and telegraph service, besides being connected by means of the central telegraph station to various other stations belonging to the company in the two cities. Watchmen are stationed along the lines night and day. At each of the stations gauges are connected with the line and the pressure at all stations is sent to the main city office every hour and from this office the pressures are regulated."

Definition of the Contract Labor Law.

The Secretary of the Treasury has sent a communication to the Secretary of District Assembly No. 46, K. of L., Buffalo, N. Y., in which he defines the effect of the act on aliens residing in adjoining foreign territory, and under what circumstances prohibited from entering the United States The communication says: "In answer to your letter, propounding certain questions relative to alien laborers, you are informed that, under the provisions of the act of February 23, 1887, prohibiting the importation of foreign laborers under contract, it is not necessary that the contract be in writing, signed by the parties, to render the person hiring or engaging such laborers liable to the penalty provided in section 3 of the act. An oral contract is sufficient, or, as expressed in the act, any 'contract or agreement, parol or special, express or implied, made previous to the importation or migration of such alien,' &c. By reference to the letter of the acting secretary of May 16, 1887, on the same subject, addressed to the Hon. John B. Webber, cited in your letter, you will observe that you are mistaken in regard to what is there stated as to the kind of contract forbidden by the act.

"Section 1 of the act referred to makes it unlawful for any person, company, partnership, or corporation in any manner to prepay the transportation, or in any way assist or encourage the importation or migration of aliens into the United States, under any contract or agreement made previous to the importation or migration of such aliens.

"If the circumstances under which an alien laborer enters this country are such as would lead the courts to find that there was an implied contract between him and his employer previous to his entry, a case would seem to be presented of a violation of the provisions of the act, which would not be affected by the retention of his residence in the foreign country and his daily return to his home. And if an alien residing in adjoining foreign territory and retaining his residence there enters this country without having previously made any contract to labor here, and after such entry contracts to labor, and while such contract is in force returns to his home in the foreign country and again enters for the purpose of performing the contract and pursuant to its terms, the latter entry, being under a contract previously made to perform labor in this country, would seem to be prohibited."

Riehlé Bros., proprietors of the Machine and Testing Machine Works, Philadelphia, have secured the services of the new firm of the Robert W. Hunt & Co. Bureau of Inspection, Nos. 631 and 633 "The Rookery," Chicago, to represent them in the testing machine branch of their business in the Northwest.

The Reading Railroad Company want the City of Philadelphia to pay $3,000,000 toward defraying the costs of the proposed terminal improvements in that city, which have for their principal feature the raising of the tracks, thus doing away with grade crossings.

Triple-Expansion Engine Cylinders.

The proportions of cylinders of triple-expansion engines adopted by different builders vary very considerably. The variation is greater even than that which obtained generally with the compound marine engine. The proper proportions of the cylinders depend to a considerable extent on the total ratio of expansion adopted, and the latter depends on the steam pressure employed. It is interesting to note the very wide discrepancy in the dimensions of cylinders adopted for the same boiler pressure by various English builders. In one instance a Clyde, Scotland, firm, working with a 150-pound boiler pressure, use a ratio of low-pressure cylinder to high-pressure of 6.7; while a firm in Hull, for the same pressure, adopt in one case a ratio of 8, and in others 6.2 to 6.8 In the case of the steamship Aberdeen the boiler pressure is 115 pounds, and the ratio of high-pressure cylinder to low-pressure cylinder is 5.4. With 140-pound boiler pressure, one eminent firm adopts a ratio of 6.1, and another, with boiler pressure of 135 pounds, makes the ratio of 6.4. Of course some variation in practice is to be expected, but they cannot all be right. In working out the powers of the triple-expansion engines theoretically, practice seems to point to about 15 pounds absolute as the best terminal pressure to assume. The absolute initial pressure divided by that number gives the best ratio of expansion to adopt under most circumstances. With such data the average mean pressure referred to low-pressure cylinder approximates to about one-fifth of the boiler pressure in practice. From this data it is easy to arrive approximately at the diameter of low-pressure cylinder required for a given horse-power and boiler pressure. The size of this cylinder does not give rise to much variation in practice. The diameters, however, of the high-pressure and intermediate cylinders vary considerably according to the opinion of various engineers. With the three-crank engine the object should be to obtain as nearly as possible equality of power and stresses in the three cylinders, with equality in the ranges of temperature. As with the compound engine, so with the proportioning of triple expansion engines —some builders exhibit a good deal of rule-of-thumb work, which does not indicate that they have rationally solved the problem of what they turn out in practice. The best ratios, however, and something like uniformity of practice under similar conditions should be sought for.

A Prosperous Copper Mine.—The advance official summary of the Tamarack Mining Company, for the fiscal year ended June 30, is at hand, and shows remarkable progress in 12 months. When the second shaft is completed, another great stride forward will be in order. The statistics for the year compare as under with the previous year:

	1887-88.	1886-87.	Increase
Product, mineral, ℔	13,607,234	6,232,119	7,375,115
Per cent. fine copper	76.36	74.40	1.96
Product fine copper, ℔	10,389,867	4,639,521	5,753,346
Gross receipts	$1,448,944	$474,615	$974,239
Expenses	597,239	380,582	216,657
Profit	851,705	94,032	757,673
Profit per ℔	8.058c.	2.04c.	6.018c.
Construction	$150,986	$194,187	* $43,201
Dividends	120,000	.....	120,000
Balance assets	606,164	25,445	580,719

* Decrease.

The cost of mining in the last year was 3.97 cents, the cost of copper delivered in New York was 5.75 cents per pound; price received, 13.86 cents per pound. For April, 1888, the cost per pound at New York was 6.60 cents, and in December, 1887, it was 5.03 cents. The price received ranged from 10.71 cents in July, 1887, to 16.21 cents in February, 1888.

Foreign Markets.

EQUIVALENTS

	Cents.
Franc, Peseta or Lira	19.3
Florin (Netherlands)	40.2
Florin (Austria)	35.9
Milreis (Portugal)	$1.08.
Milreis (Brazil)	54.6
Mark (Germany)	23.8
	Pounds.
Kilogram	220.5
Picul	134.

WEST INDIES.

PORT OF SPAIN, TRINIDAD, July 20, 1888.—*Asphaltum.*—Our market has been moderately active and steady at $14.04 ℔ ton Boiled, and $6.84, Crude, on the dock, including the export duty. Since January 1 there have been shipped 33,009 tons, against 21,859 last year, and 17,839 in 1886. *Exchange*, 90 days' sight on London, may be quoted $4.77 @ $4.83.—*E. P. Masson*

ARGENTINE REPUBLIC.

BUENOS AYRES, Aug. 2, 1888.—*Iron and Steel.*—An Iron and Steel works have been founded in this city with a capital of $300,000, which have bought out the works of Vader & Pena, and will continue and extend the latter.—*Per cable via Europe.*

AUSTRALIA.

MELBOURNE, VICTORIA, July 26, 1888.—*Iron.*—Sales have been satisfactory in all branches; prices are nevertheless firm. Galvanized Iron is bringing without difficulty £16. 10/, however, and Fence Wire £9. 15/. Scotch Pig Iron, Clyde No. 1, is selling at £5. *Tin.*—During the fortnight Tin shipments from the Continent and Tasmania amounted to 225 tons.—*Per cable via Europe.*

RUSSIA.

ST. PETERSBURG, August 10, 1888.—*Petroleum.*—As per circular of Messrs. Burkhardt & Co., Batoum, the following shipments of Petroleum, lubricating Oil and residue were made to Europe, India, the Straits, China and Japan during the first six months per steamer:

In Tank Steamers to Europe.

	Steamers.	Crude Oil. Pud.	Refined. Pud.
To England	12	1,532,740	.... ..
To Germany	4	255,584	192,574
To Austria	20	582,553	1,459,236
To Italy	4	432,455	.....
To Belgium	7	471,086	.. ..
To Russia	8	757,3 0	.....
To France	1	.....	.....
Total	56	4,031,778	1,651,810

	Residue. Pud.	Machine Oil. Pud.	Cylinder Oil. Pud.
To England	.....	.....	.....
To Germany	.....	.....	.....
To Austria	145,634	.....	.....
To Italy	.....	.....	.....
To Belgium	206,198	44,895	.....
To Russia	.....	.....	.....
To France	42,234	28,900	14,955
Total	494,066	73,795	14,955

To Asiatic Countries.

	Steamers.	Re'd Petroleum. Cases.	Weighing in Pud.
To British India	16	1,176,980	2,353,960
To the Str's Settlements	3	190,693	281,386
To Japan	3	190,525	281,050
To China	3	190,666	281,336
Total	25	1,748,864	3,197,732

The Pud weighs 36⅛ ℔ American.—*Journal de St. Petersbourg.*

EAST INDIES.

PENANG, July 7, 1888.—*Tin.*—Receipts since the 22d ult. reached 8000 piculs, of which Europeans took 3000 and Chinese 4000. Prices for Larut Tin opened at $30.40 ℔ picul and rose to $30.55, while Europeans began to procure other sorts, which caused a decline in the former to $29.31 to recover to $33.40, at which Chinamen remain buyers. Europeans confine their buying to Larut Tin. Receipts from the interior remain moderate.—*Schmidt, Kustermann & Co.*

MANILA, August 13, 1888.—*Hemp.*—There are buyers at $10.12½, against $9.87½ ℔ picul same date last year, equaling respectively £33. 10/ and £33. 4/6 ℔ ton, cost and freight. There have been no clearances for the United States during the week, whereas last year 5000 bales were cleared; since January 1 they amount to 99,000 bales, against 138,000 last year, while there are loading 10,000, against 16,000. The clearances for England since January 1 have been 221,000, against 137,000, and there remain loading for the same destination 12,000, against 8000. Cleared for all other ports, 46,000, against 26,000; receipts at all ports since last cable, 17,000, against 8000; do. since January 1, 363,000 bales, against 287,000 last year and 241,000 in 1886. *Freight*, $6, against $6. *Exchange*, 3/5 @ 3/5¾. *Silver Coinage.*—At a meeting of Spanish and other merchants it was resolved to petition the home Government, in view of the depressed rates of exchange, to cause Silver dollars to be coined for circulation in this colony, of the fineness of 9/10, and thenceforward treat Mexican dollars merely as if they were Bar Silver.—*Ker & Co. to Charles Nordhaus, New York, per cable direct.*

SPAIN.

BILBAO, July 21, 1888.—*Iron Ore.*—Since the 21st ult. only a few single cargoes have been taken for export at 6/10 @ 7/3, Rubios, and 7/6 @ 8/, Campanil, the shipments amounting to 72,943 tons the first week, and to 67,774 the last week. The total shipments since January sum up 2,276,674 tons, against 2,676,032 tons same time last year. *Pig Iron.*—The export has during the fortnight not exceeded 300 tons, while coastwise 1607 tons have left our harbor. To-day's quotations for Pig Iron f.o.b. ℔ ton here are 60 pesetas or francs. Spot, Nos. 1 to 3, and 57, Nos. 4 to 6; Futures may be quoted 58 and 55 respectively; Lingotillo at Huelva or Seville, 65.—*Bilbao Maritimo y Comercial.*

GERMANY.

HAMBURG, August 4, 1888.—*Iron.*—The Pig Iron market is as dull as ever, including Spiegel, which remains 56 marks ℔ ton, 10 to 12 ℳ, without an export demand. Forge Pig is depressed; at Siegen it is selling for 47 @ 48; orders reach to the middle of October. Luxemburg may be quoted 38.70 @ 40 marks. All other Pig remains quiet and unaltered. Finished Iron has become slightly livelier for Domestic, but the export is positively extinct. Machine shops, foundries and car manufacturers are all doing well in Rhenish-Westphalia. Bessemer Steel Billets are quoted 135; Wire Rods, 120 @ 121; Steel Rails, 115 @ 120. After English Rail-makers shall have agreed, the negotiations for a renewal of the International Steel Rail syndicate may be resumed. Frederick Krupp, of Essen, sold the Andalusian railroads 14,000 tons at 113 francs laid down at Cadiz, while the French St. Chammond Steel Works asked 126 francs. While the outlook in the Iron trade in Westphalia is anything but encouraging just at present, Upper Silesia has no fault for complaint, even in the Wire branch it has not. Export of Iron, Hardware and Machinery from Germany the first six months:

	1888. 100 kg. net.	1887. 100 kg. net.
Scrap Iron, Pig, Billets, Old Rails and Ingots	876,426	1,758,101
Hardware	4,178,485	4,844,653
Machinery	398,390	356,487
Total	5,453,310	6,959,193

Import:	1888. 100 kg. net.	1887. 100 kg. net.
Scrap Iron, Pig, Billets, Old Rails and Ingots	891,305	676,108
Hardware	215,847	233,366
Machinery	193.507	146,248
Total	1,300,659	1,055,722

NEW PUBLICATIONS.

THE CHEMICAL ANALYSIS OF IRON.—By Andrew Alexander Blair. J. B. Lippincott & Co., Philadelphia. Price, $4.

Mr. Blair is too well known as a metallurgical chemist and as one of the leading contributors to the literature of his particular branch of science to need an introduction to the iron trade. His summary of methods published in connection with his work on the Tenth Census will be particularly remembered. Since then an army of progressive young men have been busy in our chemical laboratories, steadily perfecting and simplifying methods. It is their work as well as his own that Mr. Blair has gathered in a comprehensive treatise, which will prove invaluable to the beginner and will be of much service to even the most experienced. Naturally the bulk of the work is descriptive of Mr. Blair's own practice, supplemented by assistance and suggestion from some of our leading iron works' chemists, and by a critical study of the mass of scattered literature in which others have put their experiences on record. The work is thorough, without being too elementary. It is naturally subdivided into one part which deals with apparatus and reagents, a second descriptive of the methods used in the analysis of pig iron, bar iron and steel, taking up necessarily sulphur, silicon, slag and oxides, manganese, carbon, titanium, copper, nickel, cobalt, chromium, aluminium, arsenic, antimony, tin, tungsten and vanadium. The third part deals with the analysis of iron ores and the fourth with the analytical work connected with the materials of the stackhouse and the analysis of gases. Mr. Blair's is a standard work which will prove the chief guide of the young chemist and a frequent guide to more experienced analysts. There is one suggestion which we would like to make, since we believe that it would be prized by beginners, and that is a more frequent statement as to the time which different methods require in the hands of a skilled analyist. Mr. Blair refers to this point repeatedly, but we know how much aid it is to a beginner to be able to check his progress in this respect by that of his seniors, especially when he is located where personal conferences with them are out of the question.

TREATISE ON PATENT ESTATE.—By Thomas B. Hall. Published by Ingraham, Clarke & Co., Cleveland, Ohio. 12 mo. Law binding. Price, $3.

Mr. Hall's work grew out of the accumulation of notes, made for personal use, on features of the patent law which have remained comparatively undeveloped. In a series of chapters Mr. Hall deals with the objects of our patent system, with their property right and its profits, and their partition. He takes up the questions arising from the accounts between part owners, the infringement between part owners and the limitations of sectional grants. After quoting the cases, Mr. Hall ends his chapters with a brief summary of conclusions. An appendix gives a number of leading opinions not in technical patent reports. Although written strictly from the standpoint of a lawyer, manufacturers, inventors and business men will find a study of the work valuable, and reference to it will guide in determining questions often perplexing to those not versed in law.

STEAM HEATING. An Exposition of the American Practice of Warming Buildings by Steam. By Robert Briggs, M. I., C. E. 122 pages. Size 4 x 6 inches. Published by D. Van Nostrand. Price 50 cents.

The valuable little book before us is numbered 68 in the Van Nostrand Scientific Series, and this much description will, in a general way, inform our readers what the volume is like so far as appearance is concerned. The part by Mr. Briggs occupies 70 pages of the book, the remainder, or addendum, being written by Alfred R. Wolff, M. E., and contains some empirical data on steam heating. The steam-heating portion is reprinted from the "Proceedings of the Institute of Civil Engineers," and was prepared, presumably, for the purpose of informing English readers concerning the practice of steam heating in this country. The article opens with a brief historical review of the practice, after which some 20 odd pages are devoted to wrought-iron welded tubes and couplings, the subject being fully treated with the aid of tables and formulæ. The subject of boilers is very briefly noticed and treated only in a general way. The theory of the circulation of steam follows, and some remarks are added on the clothing of steam mains. Steam stop valves are illustrated and described and the remainder of Mr. Brigg's work is devoted to radiators, their use and construction. The appendix by Mr. Wolff contains data in the shape of tables and formulæ that will prove of special interest to those who investigate the subject of steam heating from a theoretical standpoint and who are not afraid to handle mathematics. A table at the end giving chimney and boiler proportions, which was prepared by Mr. William Kent, possesses considerable value for those who do large steam-heating jobs.

TRADE REPORT.

Chicago.

Office of *The Iron Age*, 95 and 97 Washington St., CHICAGO, August 20, 1888.

Pig Iron.—Business fell off somewhat during the past week, but it has been far from dull. In fact, some furnace agents have found a better demand for their Iron than during the previous fortnight. The withdrawal of a number of furnaces from the market in consequence of the sale of their entire product for months to come has given others a better opportunity to secure orders. Buyers being now restricted as to brands, an impr ved feeling is noticed among sellers and the upward tendency in prices is more decided. Some of the favorite Soft Irons have been marked up 50¢ ℔ ton in the past week, and the others will soon follow, if the present demand continues. The large consumers of Lake Superior Charcoal have not all bought, and heavy transactions are yet to come in this line, which causes prices to be held firmly at the advance made last week. Although some brands of Lake Superior Coke are still avilable at old figures, sellers of competing brands state that orders are being secured with little difficulty at considerably higher prices. Southern Coke Iron has been freely sold at outside quotations. We quote for cash as follows, f.o.b. Chicago: Lake Superior Charcoal, all numbers $19 @ $20; Alabama Car-Wheel, $26.25; Southern Charcoal Foundry, No. 2, $18 @ $19; Jackson County Softeners, No. 1, $18 @ $18.50; Hocking Valley, Soft Foundry, No. 1, $17 @ $18; American Scotch (Blackband) No. 1, $18.50 @ $19.50; other Ohio Scotch Irons, No. 1, $17.50 @ $18; Lake Superior Coke, No. 1, $17 @ $18; No. 2, $16 @ $17; No. 3, $15 @ $16; Southern Coke, No. 2, $17 @ $17.50; No. 2½ and Open Bright, $16.50; No. 3, $15.50 @ $16.

Bar Iron.—Large orders are still in the market, and the condition of trade continues to improve. So many mills now have all the orders they care to take, and the price of raw material shows such a decided upward tendency, that the mills now in the field are asking higher prices. Manufacturers in the Mahoning Valley are naming 1.57½¢ at mill, half extras, as their bottom rate, and some of them have instructed their agents to take no orders, even at this figure, without first submitting them for approval. Prices for carload lots, at Chicago, range from 1.67½¢ to 1.70¢, half extras. The advance in prices is enabling some mills to secure orders which have for a long time done no business here because of their refusal to meet the low rates prevailing. Jobbers are showing their confidence in the maintenance of the advance which has been established by stocking up quite freely. They quote 1.80¢ @ 2¢ from store, according to quantity and quality.

Structural Iron.—Bridge material has been in much better demand than for some time, and manufacturers are advancing prices. Mill lots are quoted as follows, f.o.b. Chicago: Angles and Universal Plates, 2.30¢; Tees, 2.45¢; Beams, 3.40¢. Store quotations are held at 2.40¢ @ 2.70¢ for Angles; 2.60¢ @ 2.90¢ for Tees; 3.80¢ for Beams and Channels.

Plates, Tubes, &c.—No large transactions are reported in Plates, but a brisk trade has been done in the usual store lots. The mills have advanced their prices for Tank Iron, but dealers here have not changed the store quotations, although they will be obliged to do so when present contracts expire if the advance by the mills is maintained. Tubes are firmer: Store prices are as follows: Heavy Sheets, Nos. 10 to 14, 2.65¢; Tank Iron, 2.55¢; Tank Steel, 2.80¢; Shell Iron, 3¢; Shell Steel, 3.25¢; Flange Iron and Steel, 4¢; Fire-Box Steel, 4.75¢ @ 5.75¢; Boiler Rivets, 4¢ @ 4.25¢; Ulster Iron, 3.75¢; Boiler Tubes, 60 % and 10 % off on 2½-inch and larger and 62½ % off on 2-inch and smaller

Sheet Iron.—The condition of this branch of trade continues as reported last week, much inconvenience being experienced among jobbers who are unable to get the Sheet Iron for which they have placed contracts. The few mills which are not fully sold up are profiting by this state of affairs, having found numerous buyers willing to pay from 3¢ to 3.05¢, f.o.b. Chicago, for No. 27. Jobbers' prices for small lots are 3¢ for No. 24, 3.10¢ for Nos. 25 and 26, and 3.20¢ for No. 27.

Galvanized Iron. — Manufacturers' agents report a very perceptible improvement in the demand, orders being distributed over all classes of consumers. Prices are well maintained, concessions being less frequent than in previous weeks. Small lots continue to be quoted at 60 % and 5 % off for Juniata and 60 % and 10 % off for Charcoal.

Merchant Steel.—Manufacturing consumers have placed large orders during the week. Plow manufacturers have been very liberal purchasers at the prices fixed by the makers of syndicate Steels. Store trade keeps quite active, with probably a little less demand for the highest grades. Quotations from store are as follows: Bessemer Bars, 2.30¢ @ 2.40¢; Tool Steel, 8½¢ @ 9½¢; Specials, 13¢ @ 25¢; Crucible Spring, 4.40¢; Open-Hearth Spring, 2.90¢; Open-Hearth Machinery, 2.75¢ @ 3¢; Crucible Sheet Steel, 7¢ @ 10¢. Good orders for Rake Tooth Steel have been taken at 7½¢ @ 8½¢.

Steel Rails.—Some slight indications of an improvement in business are perceptible, which the manufacturers hope will develop into a more pronounced condition of healthfulness before long. Orders are known to have been placed during the week for round lots of Steel Rails, but the exact quantity and terms have not been disclosed. Inquiries are coming in a little more freely, and the prospects are quite encouraging at present writing. It is true that the North Chicago Rolling Mill Company have shut down their Rail mill for lack of orders, but the stoppage is expected to be of short duration. Quotations are nominally $31 @ $31.50, but they will be shaded for desirable orders.

Old Rails and Wheels.—Sales of Old Iron Rails are reported at $20.50. They are very scarce, however, and inquiries are numerous, and it is probable that no considerable quantity could be had at even $21. Cleveland parties state than an offer of $23 has been refused by holders of a stock of Rails at that point. Old Steel Rails are wanted at about $18.50 for long lengths, free from Frogs, &c. Old Car-Wheels are also scarce, and nominally quoted at $19 @ $19.50.

Scrap.—A better movement is noted in this material. Sales of Forge have been made to some extent, but there have been large transactions in Mill. Borings and Turnings are in good demand. For Cast there is some inquiry, but sales are slow. The higher grades of Steel Scrap are moving off, but Mixed Steel is not wanted. Dealers are now offering $13 @ $14 for Mixed Country Scrap. Selling quotations for carefully selected are as follows, ℔ ton of 2000 lb: No. 1 Forge or Railroad Shop, $18 @ $18.50; Track, $17 @ $17.50; No. 1 Mill, $14.50 @ $15; Light Wrought, $9 @ $10; Horseshoes, $18; Axles, $23; Cast Machinery, $14; Stove Plate, $10.50 @ $11; Cast Borings, $9; Wrought Turnings, $10 @ $11; Axle Turnings, $12.50 @ $13; Coil Steel, $14 @ $15; Leaf Steel, $16 @ $16.50; Locomotive Tires, $16.50.

Hardware.—Jobbers of Heavy Hardware are having a good demand for their specialties. The stiffening tendency in Iron has imparted a feeling of greater confidence to the trade, and they look forward to a very satisfactory fall season. The proposed combination of manufacturers of all articles entering into the construction of Wagons and Carriages has incited the jobbers to take measures to protect their interests, which are alluded to at length in another part of this issue. The Shelf Hardware trade is in very good shape, and the outlook is improving every day. The usual seasonable goods are moving very freely, while for staple articles a continuously good demand is being experienced. In consequence of the advance in Pig Tin the price of Solder has been marked up 2¢ ℔ lb, to 15¢. As Pig Lead is also dearer the price of Shot has been raised 5¢ ℔ sack, to $1.30. Collections are light at present, but this is usual in August.

Nails.—At last Nails seem to have touched bottom. Heavy sales have been made by manufacturers' agents to the merchants, who were apparently convinced that lower prices could not be expected. It is stoutly asserted that it is no longer possible to secure Steel Nails at the lowest rates which were current last week. An effort is on foot to make $1.90, f.o.b. Chicago, the bottom price for large lots from factory. Inquiries are numerous, and appearances now indicate a season of activity for the Nail manufacturers Small lots are quoted by jobbers at $2 for Steel Nails and $2.50 for Wire Nails. A meeting of Western Wire Nail manufacturers will be held at Cleveland to-morrow (21st) to devise some means of Improving the condition of that branch of trade.

Barb Wire.—A little improvement is noted in the demand, but prices are unchanged. Jobbers quote 3¢ for Painted and 3.75¢ for Galvanized, in small lots.

Pig Lead.—Continued heavy transactions are reported, purchases made being almost entirely for consumption. The total volume of business for the week is estimated at 900 to 1000 tons at prices ranging from 4.25¢ to 4.32½¢, easing off at the close to 4.30¢, in sympathy with advices of lower prices in the East. Brokers state that a little reaction would not be surprising after so sharp an advance, but they claim that any reaction will only be temporary.

The Ashland Furnace, at Ashland, Wis., went into blast again to-day. It makes the Hinkle brand of Lake Superior Charcoal Iron, for which Rogers, Brown & Co. are agents. Over one-half of its anticipated product for this blast has already been sold.

Charles O. Hale, 34 Wabash avenue, Chicago, has made arrangements to succeed H. F. Lockwood as Western correspondent for Hammond & Lobdell, of New York, in the Tin-Plate and Metal brokerage business. Mr. Hall is not new to the trade, having represented E. S. Wheeler & Co., in Chicago, previous to the failure of that house.

The freight rate on scrap iron from Chicago to Pittsburgh has been reduced to $2 per ton in consequence of a fight between competing railroads. A week previously the rate was reduced to $1.85 per ton to Mahoning Valley points for the same reason.

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St. }
PHILADELPHIA, Pa., August 21, 1888. }

Pig Iron.—The market is a little quiet, but is not materially different from what it was a week ago. Buyers seem comparatively indifferent in regard to placing orders for forward delivery, however, and the general feeling is that prices are about as high as they are likely to be for some time to come. Business is not what can be called bad, when the week's transactions are averaged up, but there is a lack of buoyancy which is discouraging to those who have been looking for steady improvement. There is no retrogression, however, so far as prices are concerned, although there is some little falling-off in the demand and in view of the expected increase in the output during the later months of the year, consumers are disposed to take their chances rather than place orders at the prices usually demanded for late deliveries. But the offerings are not large, and the current demand for small lots in connection with deliveries on former contracts, entirely prevents anything like accumulation. Hence there is no apparent reason for expecting anything in the market different to what we have had for some weeks past. A good deal will depend probably upon crop prospects, and until they can be fairly estimated it is hard to say in which direction the market will move. Reports from Iron centers West and South are decidedly favorable, and for the present little or no competition is met with from those points. The prospective increase in the output, however, may perhaps again change the current, unless it is offset by increased consumption, which, to say the least, is somewhat doubtful. But as regards this particular market, the feeling is certainly not very buoyant, and it may well be doubted if anything like large lots could be placed without making some concessions in buyers' favor. Good brands, as already stated, are in very moderate supply, but of one kind or another there is a good deal of Iron for sale, and to that extent the position is less favorable than it was two or three weeks ago. Prices remain steady at $18 @ $19 at tide for No. 1 Foundry; $17 @ $17.50 for No. 2, and $15.75 @ $16.25 for Gray Forge. Southern Iron could be had at 50¢ @ $1 below these figures, but there is no demand for it unless further concessions are offered. Agents are watching their opportunity to secure business, although in the meantime markets elsewhere appear to offer better inducements than those around Philadelphia.

Foreign Iron.—No business transpiring, buyers and sellers being unable to come together. Asking prices are about $19.50, c.i.f., duty paid, for Bessemer, and $26 @ $26.50 for 20 % Spiegel.

Blooms.—Steel Blooms are moderately active, one lot of 10,000 tons of Nail Slabs having been sold by a Pennsylvania mill, besides various sized lots of Billets at about quoted rates, although on large lots special terms have been made. Quotations about as follows: Nail Slabs, $28.50 @ $29.50; Billets from $30 to $35, f.o.b. cars at mill, according to analysis; Charcoal Blooms, $52 @ $54; Run-out Anthracite $42 @ $44; Scrap Blooms, $33 @ $35 ℔ "bloom" ton of 2464 lb. Foreign at tide, c.i.f., duty paid, $29 @ $30 for Nail Slabs; $31.50 @ $32.50 for 4 x 4 Billets, and $35 @ $39 for Siemens-Martin, price according to analysis, &c.

Muck Bars.—There is a continued good demand, and prices are firmly maintained. Sales chiefly at $27.50 @ $28, delivered, holders now being somewhat firm at the outside quotation.

Bar Iron.—There is nothing to indicate any special change in the position, as compared with last week. The demand is fair, some of the mills report plenty of work, while others find it difficult to run more than half or two-thirds time. Prices are unchanged, and so irregular that they are hardly quotable. Some get 1.85¢ @ 1.98¢ for all they sell, while others are anxious for business at 1.75¢ @ 1.8¢. It is possible that there may be all the difference in quality, but large buyers claim that they can secure a perfectly satisfactory article at the inside figure, although for special brands they may have to pay more. The demand is chiefly for small lots, however, and so far as we can learn none of the mills are accumulating orders for more than a very short time ahead. Skelp is in good demand, and is helping some of the mills considerably. Orders are still on the market for good-sized lots, and will probably be taken at about 1.8¢, although some of the mills are trying to get a slight advance on that figure.

Plate and Tank Iron.—The past week has not developed any improvement in this department, although there is a pretty fair demand for small lots. Mills have not much work ahead, however, so that there is a good deal of competition to secure what little business is offered, and prices are kept at the low figures ruling during the early summer months. There is nothing important in sight, and it is to be feared that the present condition of things will continue for some time yet. Prices for small lots about as follows: Ordinary Plate and Tank Iron, 2¢ @ 2.10¢; Shell, 2.4¢ @ 2.5¢; Flange, 3.5¢; Fire-Box, 4¢; Steel Plates, Tank and Ship Plate, 2.3¢ @ 2.4¢; Shell, 2.7¢; Flange, 3¢ @ 3½¢; Fire-Box, 3¼¢ @ 4½¢.

Structural Iron.—The market is dull and mills are getting very little new business. Architectural work keeps up fairly, and there is a good deal in the way of finishing up bridge and elevated work, but apart from that the outlook is not encouraging. Prices about as follows: 2¢ @ 2.10¢ for Bridge Plate; 2¢ @ 2.10¢ for Angles; 2.6¢ @ 2.7¢ for Tees, and 3.3¢ for Beams and Channels, Iron or Steel.

Sheet Iron.—The market is not specially active, although sales keep pretty well in line with the output. Prices are irregular, depending a good deal on quantity, requirements as to quality, &c. The best makes command about the following prices for the ordinary run of orders:

Best Refined, Nos. 26, 27 and 28	3¼ @ 3½¢
Best Refined, Nos. 18 to 25	3 @ 3¼¢
Common, ¼¢ less than the above.	
Best Bloom Sheets, Nos. 26 to 28	4½ @ 4¾¢
Best Bloom Sheets, Nos. 22 to 25	4 @ 4¼¢
Best Bloom Sheets, Nos. 16 to 21	3½ @ 3¾¢
Blue Annealed	2.8 @ 3 ¢
Best Bloom, Galvanized, discount	62½ %
Common, discount	67½ %

Merchant Steel.—Manufacturers report a largely increased demand, more particularly in Tool Steel, and state that the general condition of the market is favorable. Prices for small lots are quoted as follows: Tool Steel, 8½¢; Machinery, 2 7/10¢; Crucible Spring, 4½¢; Open-Hearth Ordinary Spring, 2 7/10¢ @ 2 9/10¢; Crucible Machinery, 5¢; Best Sheet Steel, 10¢; Ordinary Sheet, 8¢.

Steel Rails.—There is very little doing in the market, although prices are a shade lower, say $28.50 @ $29 at mill for such deliveries as are convenient to the seller. Deliveries for September or October would probably command a slight premium, as mills are pretty well filled up for the next two months, but beyond that the outlook is not encouraging.

Old Rails.—Owing to the scarcity of spot lots, very little business has been done in this market of late, although there are indications of a desire to place orders by large consumers. Bids of $20.50 @ $21 could be had for late shipments, but there appears to be very little stock available at those figures.

Scrap Iron.—Small lots sell at quoted rates, and some inquiry is made for late shipments, but the prices offered are too low to permit of much business being done. Ordinary quotations about as follows: $18 @ $19 for cargo lots; $20 @ $21 for carload lots, delivered, or for choice $21.50 @ $22; No. 2 do., $14 @ $15; Turnings, $13 @ $14; Old Steel Rails, $19 @ $20; Cast Scrap, $14 @ $15; do. Borings, $9 @ $10; Old Fish Plates, $24 @ $25. Old Car-Wheels, $17 @ $18, Philadelphia, or its equivalent.

Wrought-Iron Pipe.—A number of large orders have lately been received from parties interested in the natural gas industry, influenced, no doubt, to a certain extent, by the low prices now ruling. But with an increased demand, and the various departments full, the mills will be in a better position to advance prices later on. Discounts as follows: Black Butt-Welded, 55 %; on Galvanized do., 45 %; on Black Lap-Welded, 65 %; on Galvanized do., 52½ %; on Boiler Tubes, 60 %.

Nails.—No sign of improvement is as yet apparent in this department. The general apathy of the past two months continues, with little prospect of any immediate activity. Prices from store are quoted at $2 @ $2.05, carload lots at $1.90, and in some cases less than this has been accepted.

Cleveland.

CLEVELAND, August 20, 1888.

Iron Ore.—Non-Bessemer Ores, either Hematites or Menominees, can no longer be bought for less than $4 ℔ ton. Gogebic Bessemers are in good demand at $5, with but very few offerings. An especially valuable lot of about 8000 tons sold during the week at $5.15, f.o.b. cars Cleveland. Menominee Bessemers, if not too high in phosphorus, bring $5 readily. Many demands for Ore have been declined during the past ten days, the mine owners not being inclined to dispose of a quantity of Ore beyond their ability to mine. An inquiry for 15,000 tons from a particularly valuable mine in the Gogebic district was ignored, because of the belief that the contemplated output did not warrant further sales. If the present brisk demand could have been foreseen three months ago arrangements would undoubtedly have been made for an increased production at nearly all the ranges. Freights are slowly advancing, the Escanaba rate having risen from 83¢ four weeks ago to $1.05, and the Marquette rate from $1.05 to $1.30. The lake shipments of Ore to date slightly exceed 2,150,000 tons. If the all-rail shipments are added, the total is 2,325,000 tons, as against 2,575,000 tons up to a corresponding period last year. The lake shipments by districts in round numbers have been: Marquette district, 825,000 tons; Gogebic district, 635,000 tons; Menominee district, 540,000 tons; Vermillion district, 160,000 tons

Pig Iron.—The encouraging features noticeable during the past three or four weeks continue, and the tone of the market is daily becoming firmer. Mill Irons are in very good demand at an advance of 50¢ ℔ ton over former quotations. No. 1 Foundry Iron is also held at an advance, and an upward tendency is discernable everywhere. The belief that the market cannot much longer remain stationary, and that substantial advances will soon be made in quotations for all marketable Iron, seems universal.

Scrap Iron.—A few sales of Wrought Scrap at figures said to be below $17.50,

but closely guarded, are reported. Old American Rails bring $20.50, and Old Wheels $18.75.

Cincinnati.

CINCINNATI, August 20, 1888.

Pig Iron.—Confidence is the feature of special prominence in the local Pig-Iron market. The volume of business during the past week has been only moderate, and there has been no further advance in prices, except in special instances, which are no criterion of the general market. The higher prices established during the past month, however, have been fully sustained, and the outlook is favorable for an additional advance of moment. Furnaces with full order-books are very independent, at least for the present, and will only accept new business when accompanied by offers to pay a further advance for favors received. Buyers continue to make frequent inquiries, but the attitude of sellers repels rather than encourages them. Intelligent consumers, however, are not slow to buy when a favorable opportunity offers, they recognizing the strength of producers' positions at the beginning of an active season. Furnaces place much reliance in the report that consumption is at present about 1000 tons per day in excess of production, but the latter is said to be slightly increasing. Cincinnati firms have made few, if any, 1000-ton sales during the week of either Foundry or Mill grades, but there have been several 500 and two 600-ton lots sold, and a number of car-load transactions. The aggregate for the week is doubtless between 8000 and 10,000 tons. No. 2 Southern Foundry Iron has been sold, delivered in New York, at about $16, cash, here; No. 2 Southern Mill is quotable at $14, and No. 1 has been sold equivalent to $14.50 @ $14.75, cash, here, mainly at the outside rate. Silver grades have sold at about $16.75 and Medium Bright Iron at $14.75 here. Moderate sales of Southern Car-Wheel have been made at $24.50, cash. Lake Superior Iron is in light supply. Mill iron continues to be relatively more difficult to obtain than Foundry grades. The following are the approximate quotations for the local market, cash, f.o.b. Cincinnati:

Hot-Blast Foundry.

Southern Coke, No. 1	$17.00 @ $18.00
Southern Coke, No. 2	16.00 @ 16.50
Southern Coke, No. 3	15.00 @ 15.50
Ohio Soft Stone Coal, No. 1	17.00 @ 17.50
Ohio Soft Stone Coal, No. 2	15.50 @ 16.00
Mahoning and Shenango Valley	16.50 @ 17.00
Hanging Rock Charcoal, No. 1	20.50 @ 22.50
Hanging Rock Charcoal, No. 2	19.00 @ 21.00
Tennessee and Alabama Charcoal, No. 1	18.00 @ 18.50
Tennessee and Alabama Charcoal, No. 2	17.00 @ 17.50

Forge.

Strong Neutral Coke	14.00 @ 14.50
Mottled Neutral Coke	13.00 @ 13.50
No. 1. Mill Coke	14.50 @ 14.75
No. 2 Mill Coke	14.00 @ 14.25

Car-Wheel and Malleable Irons.

Southern Car-Wheel	20.00 @ 23.00
Hanging Rock, Cold Blast	22.00 @ 25.00
Lake Superior Car-Wheel and Malleable	20.50 @ 21.00

Manufactured Iron.—There has been a fair degree of activity in all kinds and the market has improved in tone, without change in prices. Common Bar Iron, 1.90¢ @ 2¢; Charcoal Bar Iron, 2.90¢ @ 3¢; Sheet Iron, Boiled, Nos. 10 to 27, 2.50¢ @ 3.25¢; Sheet Iron, Charcoal, Nos. 15 to 25, 3½¢ @ 4½¢ ℔ lb.

Nails.—The market has ruled steady under a fair jobbing demand and an ample supply. Jobbing prices are based upon 12d @ 40d, which sell at $2 ℔ keg, with 10¢ rebate in carload lots, at mills; 50d @ 60d, 25¢; 10d, 10¢; 8d @ 9d, 25¢; 6d @ 7d, 40¢; 4d @ 5d, 60¢; 3d, $1, and 2d $1.50 per keg more. Steel Nails sell at $2 and Steel Wire Nails at $2.65 @ $2.75 ℔ keg

Old Material.—The demand for Old Rails has further increased and prices have advanced $1 ℔ ton. At the close there are buyers here at $21 ℔ ton, but none are offered, except at far-off points. There has been but little inquiry for Old Wheels, which are nominally quotable at $19, cash, here.

Louisville.

LOUISVILLE, KY., August 18, 1888.

Pig Iron.—The price of Iron has advanced during the past week 50¢ a ton, and buying has been general. Furnaces, however, have not been willing to sell for deliveries extending longer than January in most cases. It is more difficult to obtain Iron than to effect sales, as on inquiry for large lots of Iron it is found that Southern furnaces are not in position to sell for prompt shipment and not disposed to make sales for deliveries extending beyond the year. Silver Gray Iron continues very scarce, and parties holding the Iron are able to get their own price. This movement has been caused by buying in the West, especially in Chicago and St. Louis, as the Eastern market remains firm, with but a slight tendency upward. The present advance first started in the East and was followed by Cincinnati and Louisville. Other Western buyers, feeling that the market could not improve, were not willing to pay better prices than they had been paying for the past three months. However, a change has occurred during the past week, and at present Chicago and St. Louis are specially active in buying Iron. Old Wheels and Rails are in active demand. The advance of prices of Coke East has also been of benefit to the market, as consumers believe it is a legitimate advance made by the demand of furnaces for fuel, on account of their ability to obtain good prices for Iron. Every one is rejoiced over the situation and delighted that the present market did not descend as low as that experienced during the last great decline. It is not thought, however, that the market will advance much more, nor is it thought to the interest of furnaces to have too rapid changes in prices take place.

Southern Coke, No. 1 Foundry	$16.75 @ $17.75
" No. 2 "	15.75 @ 16.75
" No. 2½ "	15.25 @ 15.75
Hanging Rock Coke, No. 1 Foundry	17.25 @ 17.75
Hanging Rock Charcoal, No. 1 Foundry	21.00 @ 23.25
Southern Charcoal, No. 1 Foundry	18.00 @ 18.50
Silver Gray, different grades	14.25 @ 15.00
Southern Coke, No. 1 Mill, Neutral	13.50 @ 14.50
" No. 2 " "	13.00 @ 14.00
" No. 1 " Cold Short	13.00 @ 14.00
" Charcoal, No. 1 Mill	14.25 @ 14.50
White and Mottled, different grades	12.75 @ 13.25
Southern Car-Wheel, standard brands	22.25 @ 25.25
Southern Car-Wheel, other brands	19.25 @ 21.25
Hanging Rock, Cold Blast	23.25 @ 25.25
Hanging Rock, Warm Blast	19.25 @ 20.25

Detroit.

WILLIAM F. JARVIS & Co., under date of August 20, report as follows: Since our last report a number of inquiries for round lots of Lake Superior Charcoal Iron have been received and a number of orders have been booked. The furnaces that cannot deliver after the close of navigation are compelled to refuse orders at 50 cents over prices at which they sold a month ago. Their inability to furnish the Iron desired naturally causes the furnaces that can deliver the year round to hold at firmer prices, as they expect to sell to better advantage later on. Mahoning Valley furnaces claim that they are able to obtain 50¢ @ $1 ℔ ton advance for Bessemer and Mill Irons, and a few of these furnaces have withdrawn from the market for the present, as they are unable to deliver Iron as fast as required on orders already booked. If they remain out of the market for any length of time, an advance will certainly take place. There is a good market for Old Wheels, but sellers are asking more of an advance than buyers are willing to pay, so that there have been but few sales made. With a firm market we quote as follows:

Lake Superior Charcoal, all numbers	$20.00 @ $20.50
Lake Superior Coke, all ore	19.25 @ 19.75
Lake Superior Coke, cinder mixed	18.00 @ 18.50
Standard Ohio Black Band	19.25 @ 19.75
Southern No. 2	17.75 @ 18.25
Southern Gray Forge	15.75 @ 16.25
Southern Silvery	17.00 @ 17.50
Jackson County (Ohio) Silvery	18.50 @ 19.00
Old Wheels	19.25 @ 20.00

Pittsburgh.

Office of *The Iron Age*, 77 Fourth Ave.,
PITTSBURGH, August 21, 1888.

While there is nothing developed as yet that can be properly characterized as a boom, there has been within the past week a general hardening of prices for all kinds of Iron and Steel, which may be attributed mainly to the recent advance in Pig Iron. That there will be a good demand for all kinds of manufactured goods this fall scarcely admits of a doubt, but in view of the immense capacity for making the same it is probable that prices will be close, the natural result of an active competition. One of the chief events of the week was a resumption of river navigation; over 1,000,000 bushels of Coal were shipped to Cincinnati, and a good deal more would have been started but for the fact that the water was scant, making it risky. And besides there was nothing in the business to justify shippers in taking extra risks. The Coal markets below are well supplied, and there is no particular anxiety to make additional shipments. It looks as if the local Coal market would be considerably improved before long.

Pig Iron.—There is an active market and prices have further advanced, sales of Mill Iron having been made at an improvement of from 15¢ to 25¢ ℔ ton, as compared with the prices of a week ago, and within the last four or five weeks of almost $1. While some operators are confident that prices will go still higher, others equallly well informed are not so strong in the faith. They point to the idle furnaces which are liable to be started upon short notice, thereby leading to an increased production, as sufficient to cause a feeling of apprehension, but those who are bullishly inclined make a strong point of light supply, as well as the large and probability of increased consumption. The demand for Foundry Irons continues light, but is expected to improve as the fall season becomes more advanced. Bessemers strong with considerable inquiry, but $17.25, cash, still appears to be the ruling price, at which there was a sale of 2500 tons reported; rumors prevail of sales having been made at $17.50, cash, but they are not well authenticated, unless for special analysis. We quote prices as follows:

Neutral Gray Forge	$14.50 @ $15.00,	cash
All Ore Mill	15.50 @ 16.00,	"
White and Mottled	13.50 @ 14.00,	"
No. 1 Foundry	16.75 @ 17.00,	"
No. 2 Foundry	15.75 @ 16.25,	"
Charcoal Foundry	21.00 @ 24.00,	"
Cold Blast Charcoal	25.00 @ 28.00,	"
Bessemer Iron	17.25 @ 17.50,	"

Muck Bar.—There is more inquiry and prices have further advanced. We now quote at $27 @ $27.50, cash, although as yet there have been, so far as we can hear, but few sales made at the outside quotation. As compared with the lowest point, there has been an advance of $1.25 to $1.50 ℔ ton, and unless there is a reaction in Pig Iron a still further advance is not improbable.

Manufactured Iron.—There is an increasing demand for all kinds of finished Iron, and prices are firmer and higher; there has been an advance probably of $1 ℔ ton. The upward tendency of prices

has stimulated demand. Bars may be quoted at $1.80 @ $1.85, 60 days, 2 % off for cash, for first quality Iron. Skelp Iron is higher and is now quoted at $1.70 @ $1.75.

Nails.—The general position of the Nail trade remains unchanged. Here in Pittsburgh business is dull, which is owing to the fact that buyers can do better elsewhere, and very few orders are being placed here in consequence. We continue to quote at $1.90 for 12d to 40d, 60 days, 2 % off for cash, which is the regular card price, but buyers, as already intimated, have, until quite recently, been able to do better elsewhere. Probably now that Nail Plate has stiffened there will be but few sellers found below card rates, which are low enough in the present condition of affairs. It is possible that those who have been cutting the life out of the market will now want to advance the card, but those who have been refusing to cut below card rates will doubtles refuse, as it would only give the former another chance to cut. The Pittsburgh manufacturers are determined not to sell at or below actual cost of production.

Wrought-Iron Pipe.—There is an increasing business, but it is still considerably short of what it was a year ago. While some of the mills are pretty well employed others are not, and, while business bids fair to further improve, no special activity can reasonably be expected during the remainder of the year. Prices are firmer, owing to increased cost of Pipe Iron, which has gone up fully $1 ℔ ton. As repeatedly stated in these reports, the market has been in an unsettled condition in regard to prices since last winter, each firm making its own prices, hence it is difficult to give accurate quotations. Discounts on Black Butt Welded may be given at 55 %; on Black Lap Welded, 65 %; on Galvanized Butt Welded, 47½ %; on Galvanized Lap Welded, 52½ %; Boiler Tubes, 65 % off. The above appear to be the leading rates in this market.

Old Rails.—There is considerable inquiry for Old Iron Rails, with but few to be had, and prices are still tending upward. Sales have been made during the week under review at $22, and some of the brokers say they could obtain an advance of 50¢ to $1 per ton if they could get them for immediate delivery. The advance in the price of domestic Rails will open the way for foreign in this market, but it is probable that they too will advance. Old Steel Rails are also in demand and tending upward; may be quoted at $20.50 @ $21.50.

Billets, &c.—There is a continued good demand for Bessemer Billets and prices are tending upward; we now quote at $28.50 @ $29, cash; Nail Slabs may be quoted at $28.50; sale 1000 tons Bloom Ends at $18.50, cash; Steel Rails are still quoted at $31 @ $31.50, cash, at mill.

Railway Track Supplies.—Railway Spikes remain unchanged at $2, 30 days, delivered; Splice Bars, $1.80 @ $1.85; Track Bolts, $2.85 with Square and $2.95 with Hexagon Nuts.

Old Material.—There is an increase in demand for all kinds of Old Material and prices are firmer. No. 1 Wrought Scrap, $19, net ton; Car Axles quoted at $22 @ $23, net; Wrought Turnings, $13 @ $13.50; Cast Borings, $12, gross ton; Cast Scrap, $15; Old Car Wheels, $19 @ $20, Mixed Steel Scrap, $16.25, gross; Short Piece Steel Rails, $17 @ $17.25.

The co-partnership heretofore existing between Frank S. Moorhead and John Moorhead, Jr., under the style of Moorhead, Brother & Co., proprietors of the Vesusius Iron and Nails Works, of Pittsburgh, has been dissolved by the retirement of Frank L. Moorhead. The business will be conducted by the remaining partner in the name and style of Moorhead, Brother & Co.

New York.

Office of *The Iron Age*, 66 and 68 Duane street.
NEW YORK, August 22, 1888.

American Pig.—The majority of dealers and furnace agents report that there is a better feeling, while some assert that consumption is still below last year's average. Founders are reported to be prompt in covering their requirements as soon as they have closed contracts, and it is pointed out that this departure from the practice of taking their chances till the last moment is in itself an important gain. There is less pressure to sell, notably on the part of furnaces in Virginia, Alabama and Tennessee, but we hear of Tennessee No. 1 Foundry still selling at $17.50. Standard brands of No. 1 Northern Iron are selling at $18, and $18.50 is being secured for small lots, and $19 for choice Irons. In No. 2 we hear of offers of good brands, though not all-ore Iron, at $16 @ $16.50. In Gray Forge the recent activity, during which a number of heavy blocks were placed, has subsided.

Scotch Pig.—Some importers report a run of small orders for Scotch as softeners, while others find the trade very dull. The advance on the other side will only have the effect here of curtailing what little business there is, since Scotch Pig at present prices is relatively too dear to be extensively used. Efforts to boom warrants on the other side, through the aid of American operations, are not finding much favor. The market there is said to be on the eve of an advance if it can be shown or can be made to appear as though there were buying on American account. We quote: Coltness, $19.75 @ $20; Dalmellington, 18.75 @ $19.25, and Langloan, $19.50.

Bessemer Pig.- Sales of several thousand tons of foreign Bessemer are reported, a part being best West Coast brands and a part special Pig.

Spiegeleisen and Ferro.—Spiegeleisen remained dull at $26 for German and $27 for English 20 % nominally. Foreign Ferro is held higher, $50 @ $50.50 for 80 %, the price having advanced abroad on account of a scarcity of Ore.

Bar Iron.—We continue to quote for carload lots, half extras, on dock, 1.57½¢ @ 1.65¢ for Common; 1.65¢ @ 1.7¢ for Medium, and 1.75¢ @ 1.9¢ for Refined.

Structural Iron.—We quote for round lots, on dock: Sheared Plates, 2¢ @ 2.10¢; Universal Mill Plates, 2.10¢ @ 2.15¢; Angles, 2.5¢ @ 2.15¢; Tees, 2.5¢ @ 2.7¢ and Channels and Beams, 3.3¢.

Plates.--We quote for round lots, on dock: Iron Tank, 1.9¢ @ 2¢; Shell, 2.15¢ @ 2.30¢; Steel Tank, 2.25¢ @ 2.3¢; Shell, 2.4¢ @ 2.5¢; Flange, 2.7¢ @ 3¢, and Fire-Box, 3.7¢ @ 4¢. Galvanized Sheets are 65 % @ 65 and 5 %.

Steel Rails.—Sales by Eastern mills aggregate about 15,000 tons, of which one block of 5000 tons was for a Southern road, with option to double the quantity, and two others were for Coal roads, closed during the past ten days and not yet reported. The competition is extremely sharp, and the outlook is gloomy. Very few of the Eastern mills have their September capacity fully engaged, and a smaller number still have anything but straggling orders for later delivery. At this time of the year the fall requirements ought to cause a lively market, and yet the business coming up is comparatively small. The majority of contracts are made at a delivered price, and as they are largely dependent upon special freight arrangements, the mill prices obtained are not generally known. We quote: $28.50 @ $29 at mill for standard sections, there being rumors of sales as low as $29 at tidewater. In the West the condition of affairs is as bad if not worse. It is reported that 3000 tons of Rails for the Northern Pacific was sold at $31.25 Duluth, other bids being $31.60, $31.65 and $32.

Wire Rods.—There have been a number of sales at low prices for Western delivery prior to the close of navigation, low canal freights having been obtained. The German makers, disappointed in the relatively small business doing on their side, have lowered their prices to 102/ @ 103/ at shipping port, and the fact that American mills in the West have been crowded with orders has given an opportunity to again invade the Western market. We quote at tidewater $39.50 @ $39.75.

Old Rails.—The market has been active again, the following sales being reported: 2000 tons American Tees at $22, delivered, Mahoning Valley; 1000 tons Tees at $21, on barge, New York; 1500 tons foreign Tees at $21, delivered to lighter, and 200 tons of Tees at $21.25, delivered to lighter. We note also a sale of 3000 tons of Tees at $18 at New Orleans, for shipment to a Western mill. The demand continues active, several inquiries of some magnitude being in the market, with $21 bid. The supply here is light, and the Double Heads particularly are held above the market. Present prices are too low to admit of importations, but cable inquiries have already gone abroad, and the conviction is expressed by some that the winter will not pass without importations.

Scrap.—The market is dull at $18 @ $19 for No. 1 Wrought.

Fastenings.—The market for Spikes has been more active, and a number of large blocks have been sold; $2.10 is now the lowest price, and there is a movement in progress among the mills to advance the price to $2.25 at an early date. The idleness of the mill of Dilworth, Porter & Co., of Pittsburgh, and of the Ames works at Jersey City is an important feature in the situation. Angle Bars are firmer, but unchanged at 1.90¢, delivered.

Cotton Ties.—We quote $1.05 @ $1.12½ ℔ bundle at Gulf ports, according to time of delivery.

Financial.

All accounts concur in representing that general trade is improving not only in volume and activity from week to week, but when compared with the corresponding date last year. As the season advances the assurance of good crops becomes more positive, accompanied by increasing evidence that the European demand will be heavy. The London *Economist* says, from reports of its special correspondents, that estimates on the French crop have been reduced to 80,000,000 hl., or 227,000,000 bushels. In Germany crop prospects were depressing. In Austria-Hungary the crop had been gathered in fair condition and was large, but after being gathered heavy rains set in and caused serious damage.

A reference to the speculative markets in this city shows unusual excitement in cotton and breadstuffs, and high prices for oil. The dry goods jobbing trade was unfavorably influenced by the extreme heat, and although better than the previous week did not realize expectations. The most interesting feature was the large business done in wool. At Boston and Philadelphia the transactions are given at nearly 11,000,000 lb., and all markets were higher, indicating that manufacturers are well supplied with orders. The

anthracite coal trade is phenomenally large. In New England special activity is noticed in shoe and leather establishments.

In the New York markets on Monday there was a collapse in August cotton, the "corner" being unable to bear up longer under the pressure. Market opened at 11.18 and closed at 10.74, a drop of 44 points. Inman, Swan & Co., the holders of the cotton, are said to have made $2,000,000. It is also said that they still control 135,060 bales of cotton, of which 35,000 bales are loading for export. Another sensation was a sudden jump in wheat, spot stock, 2¢ @ 2½¢ ℔ per bushel, with good export trading, and millers bought more freely. Flour was also very active. At the same time there was another marked advance in grain freights to the United Kingdom. Petroleum was steady at ½¢ advance. Altogether the Produce Exchange presented a scene of unusual animation.

The Stock Exchange markets were irregular, and for the most part dull and weak. On Thursday and Friday the reaction was equal to 1½ @ 2 %, affecting almost the entire list. On Monday prices were firmer. The Pennsylvania road and the Vanderbilt lines advanced rates on dressed beef from Chicago to the seaboard, but the rates via Duluth and those via Chicago have not yet been equalized, and the movement looking to the restoration of rates in the Northwest made very little, if any, progress during the week. The coaling properties suffered least.

Government bonds very strong, with 4s ¼ % and 4½s ⅛ % higher. Quotations are as follows:

U. S. 4½s, 1891, registered	106⅝
U. S. 4½s, 1891, coupon	107¾
U. S. 4s, 1907, registered	128¾
U. S. 4s, 1907, coupon	128¾
U. S. currency 6s	120

The weekly bank statement showed a further loss of $2,370,575 in the surplus of reserve above the 25 % legal requirements. The excess of reserve is thus reduced to $21,736,250. The loans show a gain of $2,118,600; the specie is decreased $1,115,900; the legal tenders are down $1,386,600. There is reason to believe that the actual condition of the Associated Banks is much better than that shown by the averages. In any event, the amount of the surplus reserve is considered ample for all requirements, being five times as large as it was a year ago, and over three times as large as in the preceding year. In addition, the large export movement of produce, and the lower rates for foreign exchange, together with the more liberal policy of the Secretary of the Treasury, tend to dismiss any lingering fears of monetary stringency. Money on call is 1½ % @ 2 %. Time loans on good collateral are quoted: Sixty days, 2 @ 2½ %; three months, 3 %; four months, 3½ %, and six months, 4 % @ 5 %. Commercial paper is fairly active. The best single-name paper sells at 4½ % @ 5 %, and good double-name paper is readily placed at 4 %. Sterling exchange is firmer for demand bills.

The purchases of United States bonds under the circular of April 17 are as follows: Amount purchased, 4 per cents, $22,762,600; 4½ per cents, $10,535,300; total, $33,297,900. Cost of 4 per cents, $28,941,727.82; 4½ per cents, $11,341,355.07; total, $40,283,282.89. Secretary Fairchild has directed that all the bonds purchased by the Government since July 1 shall be applied to the purposes of the sinking fund. The estimated requirements of that fund for the present fiscal year are $47,850,000, and the Secretary proposes to meet them, if possible, by the purchase of bonds made under the terms of the circular of April 17.

The total clearings of 38 cities for the week ending August 18 were $871,161,388, an increase of 7.8 %, as compared with the corresponding period last year. New York increased 7.5 %, Boston, 12.1 %, Philadelphia, 19.9 %, Pittsburgh, 25.1 %, Omaha, 31.9 % and Duluth, 85.2 %. New Haven decreased 20.9 %, Galveston, 17.9 %, St. Joseph, 17.1 %, Columbus, 13.1 %, San Francisco, 10.4 % and Cincinnati, 4.7 %.

Respecting crop prospects in the United States the latest Government report says the weather during the week has been favorable for growing crops in the wheat and corn regions of the Northwest, where reports indicate that the crop prospects have been improved. The St. Paul *Pioneer Press* estimates the wheat crop of Minnesota and Dakota at 100,000,000 bushels. Ultra conservative judges make the figure 10,000,000 to 15,000,000 bushels less. The Northern Pacific Railroad Company, in this city, have advices that harvesting has commenced on the Black Hills and Little Falls branches, in Dakota. The indications are that crops will be double those of last year and of the best quality. On the West Minnesota division the crop will not be gathered for a week or ten days yet in the country tributary to the Dakota line. It is predicted the crops will be the largest and best in this region for a number of years. The harvest is also in progress along the line of the St. Paul division. The cotton crop is reported to be in good condition, though some small sections in Texas are suffering from drouth.

According to the Custom House report the exports of specie from this port during the week amounted to $240,000 and the imports were $75,000. Since January 1 the total exports are $26,250,000; imports, $5,758,000.

The imports of merchandise at this port were larger, the total valuation being $9,260,000, of which $3,000,000 represents dry goods. Since January 1 the total is $301,089,000, as compared with $302,619,900 for the same time last year and $275,925,000 in 1886.

The attorneys for the State of Iowa say in regard to the suits brought against the railroads for extortion in charges for freight: "If test cases were brought and the railroads got them into the federal courts, they could delay final adjudication for years, and in the meantime the Iowa jobbers would be ruined. Our plan is to begin a large number of cases, so that the penalties, in case the railways are defeated, would be an incentive for them to have the matter settled as soon as possible."

Metal Market.

Copper.—The market on both sides of the Atlantic has been featureless during the week, with very little disposition to trade. London improved with spot Chili Bars from £81. 10/ to £82. 10/ this morning, while futures gave way from £78. 5/ to £78; good merchantable brands advanced from £73. 5/ to £73. 10/, and Best Selected from £76 to £76. 10/, sales summing up 500 tons, while the sales here were confined to small spot lots at 16.65¢ @ 16.75¢, and 400,000 lb August at 16.65¢; for later months 16½¢ is bid. One of the oldest gentlemen in the Copper trade remarked this morning that M. Secretan only maintains such a high price for Copper in order to get from the French bankers as much money on his holdings as possible, and that the smash-up, when it does come, will be all the more fearful and disastrous. The import of Ingot Copper into France during the first six months has been 22,258 tons, against 11,013 tons last year and 9636 in 1886. Rio Tinto shares improved on the Paris Stock Exchange 21 francs last week.

Tin.—Tin touched £94. 10/ with futures last Thursday in the London market, but after some fluctuations they are now £93, while spot Tin has from £92. 15/ given way to £92. 10/ in the meantime, sales aggregating over there 300 tons. Here but little transpired, the demand being the reverse of active; and after some wavering closes nominally as follows: Spot, 20.75¢ @ 21.10¢; August, 21.10¢ @ 21.15c; September, 20.75¢ @ 20.90¢, and October, 20.65¢ @ 20.85¢. As per cable from Gilfillan, Wood & Co., Liverpool, to Mr. Charles Nordhaus, E. I. agent, No. 89 Water street, New York, the Straits Settlements shipped to the United States, August 1 to August 15, 150 tons of Tin against 450 same time last year, and 500 to England against 1000. Since Jan. 1 the shipments this way were 1300 and 3250 respectively, and to England they were 11,100 against 8000. *Tin Plates.*—Cokes are still scarce, and wanted and held with great firmness, other sorts have been barely sustained, and futures unsettled by the uncertain aspect of the Pig Tin market. We quote toward the close, large lines, ℔ box, on the spot: Siemens-Martin Steel, charcoal finish, $4.85 @ $5.25; Coke finish, $4.75; Ternes, $4.30 @ $4.40; Bessemer Cokes, $4.50 @ $4.60, and Wasters $4.20 @ $4.25; Liverpool is 13/6 with Coke Tin.

Lead.—The chief operator has been untiring in trying to pick up some more Lead on the spot, and October and November delivery, and in this manner some 1800 tons were sold in the open market at 4.40¢ down to 4.30¢, the quotation toward the close being 4.30¢ @ 4.35¢; 16 tons October brought 4.32½¢; 96 tons do., 4.30¢ @ 4.32½¢, and some September, 4.37½¢, on the Metal Exchange since our last report. Chicago and St. Louis are 4.30¢, strong. In London Soft Spanish remained steady at £13, while English Pig rose from £13 to £13. 5/.

Spelter—Has attracted a great deal of attention both on 'Change and in the open market, and has been active, with a gradual rise to 5¢ on the spot for Common Domestic; 32,500 lb October Spelter brought on 'Change 4.85¢ this forenoon. The best Blende Ore out West has risen from $22 ℔ ton to $26, and, it is anticipated, will command $30 ere long from actual scarcity, while the demand is good. In Europe the markets have also been rising steadily, and Silesian has improved from £17 to £17. 5/. They cable thence that there is a great and growing consumptive demand over there. Silesian cannot now be laid down here for less than 5.45¢, and the quotation at the close is 5.45¢ @ 5.50¢ for it.

Antimony—Has been moderately active 9⅝¢, Hallett, and 13½¢, Cookson. The former dropped from £39 to £38.

New York Metal Exchange.

The following sales are reported:

THURSDAY, August 16.	
25,000 lb Copper, spot	16.70¢
FRIDAY, August 17.	
175,000 lb Copper, August	16.65¢
32 tons Lead, September	4.37½¢
10 tons Tin, September	20.80¢
10 tons Tin, September	20.65¢
200,000 lb Copper, August	16.65¢
16 tons Lead, September	4.37½¢
32 tons Spelter, October	4.70¢
16 tons Spelter, October	4.72½¢
MONDAY, August 20.	
16 tons Lead, October	4.32½¢
80 tons Lead, October	4.30¢
TUESDAY, August 21.	
20 tons Tin, October	20.85¢
16 tons Lead, October	4.32½¢

Coal Market.

The Anthracite Coal market is active almost beyond precedent for this season of the year, the output from the mines being enormous, and increasing from week to week, so that the "banner month," August, 1884, is likely to be surpassed. For the week ended August 18 the total from

the three mining districts was 920,922 tons, which is an excess of 90,000 tons compared with the previous week, and 210,000 tons compared with the corresponding week last year. The comparison for the last three weeks is as follows:

	Tons.
Week ended August 4	754,883
Week ended August 11	831,615
Week ended August 18	920,922

The official statement for July showed an output for that month of 3,366,272 tons, and although these figures exceeded previous estimates, it seems probable that they will be equaled or even surpassed by those for the current month. Since January 1 the output is 22,256,823 tons, an excess of about 900,000 tons compared with the same time in 1887. During the first seven months of the present year there were consumed over 1,000,000 tons of Anthracite more than during the corresponding period last year, from which fact the inference is warranted that the market is constantly broadening and that the demand by manufacturers has in no degree diminished.

The freight rate from the mines to New York has been increased 10¢ per ton, to take effect September 1, and it is reported that some of the Wyoming companies propose to make the rate to New York city $2. The new rate to Buffalo will be $2.25 per ton, and to Chicago, $4.50. Quotations remain as follows: Wyoming Free Burning, f.o.b. at South Amboy and Weehawken, Broken or Grate, $3.85; Egg, $4.15; Stove and Chestnut, $4.50; Reading Hard White Ash, Chestnut, $4.40; Stove, $4.50; Egg, $4.25, and Broken, $4.10. Reports are current that the sales agents in this city contemplate making another advance at a meeting next Friday, for New York, New England and Western markets. The advance talked of is 15¢ @ 25¢ on Stove, 25¢ @ 35¢ on Nut, 15¢ @ 20¢ on Egg, and 10¢ @ 15¢ on Broken Coal.

Bituminous Coal is reported firmer and more active. Pool prices are $3.25, f.o.b.

British Iron and Metal Markets.

[*Special Cable Dispatch to The Iron Age.*]

LONDON, WEDNESDAY, August 22, 1888.

There is no apparent change in the situation of the Copper market here. A delay in the arrival of a Pacific steamer has caused temporary scarcity of "cash" lots of Chili Bars for contract delivery. This naturally served to stiffen prices somewhat, but the fact was made little, if any, use of by the syndicate interest for speculative purposes. In fact there is no evidence of any change of policy on their part. It is announced that the terms of sale of the Quebrada product to the Société des Métaux are £70 for Selected Copper, the total amount of supply 12,900 tons and the deliveries to run three years. There has been a more active demand for furnace material latterly from consumers and it is reported on good authority that, among other sales, the Société des Métaux have disposed of 12,000 tons Anaconda Matte to English smelters at 14/3 per unit, at Liverpool. The Société is now asking 15/. There is some increase in the offerings of outside Copper, but, while finding slow sale, this supply has little or no effect upon the market for Chili Bars or other products controlled by the syndicate.

The firmness of the Block-Tin market, so far as can be judged, is due mainly to persistent purchases by the "bull" party; but it is stated that American buyers have taken hold with sufficient freedom to help the "bulls" in the effort to run prices up, or at least maintain at a high point where the opposition cannot cover except at a loss. The purchases for consumption are moderate.

The market for Scotch Pig Iron continues to derive more or less support from a demand from the "bears," on warrants for covering purposes. Makers' Iron, however, gains additional firmness from reports of increasing orders from the American market. It is stated that orders have been placed for a good quantity of certain specially favored brands to be shipped at an early date. Prices are a trifle higher on some brands of Scotch Pig, but last week's figures prevail on Middlesboro and Bessemer, and on Spiegeleisen.

Steel Ship Plates have been in quite active demand, and liberal orders placed recently have caused several makers to withdraw from the market unless buyers consent to an advance on deferred deliveries. There is also a good business in Steel Rails at firm prices, but Blooms, Billets, Slabs and Rods are in only moderate request.

A better demand is reported for Old Iron Rails, the inquiries coming mainly from the Continent. Prices show a hardening tendency.

Scotch Pig.—Business has shown further increase, and prices are again a shade higher on some brands.

No. 1 Coltness,	f.o.b.	Glasgow	48/6
No. 1 Summerlee,	"	"	48/6
No. 1 Gartsherrie,	"	"	46/
No. 1 Langloan,	"	"	46/
No. 1 Carnbroe,	"	"	41/6
No. 1 Shotts,	"	at Leith	46/
No. 1 Glengarnock,	"	Ardrossan	44/
No. 1 Dalmellington,	"	"	41/6
No. 1 Eglinton,	"	"	40/3

Steamer freights, Glasgow to New York, 6/; Liverpool to New York, 7/6.

Cleveland Pig.—No further change in prices, but the market fairly active and firm. No. 1 Middlesboro', G.M.B., 35/9; No. 3 do., 33/3.

Bessemer Pig.—Trade has been of larger volume, and values remain very firm. West Coast brands, mixed numbers, 44/, f.o.b. shipping point.

Spiegeleisen.—The market remains very firm, with demand good. English 20 % quoted 80/, f.o.b. N. W. England shipping point.

Steel Rails.—Higher prices asked by makers generally. The demand continues good. Standard sections quoted at £3. 17/6, f.o.b. at N. W. England shipping point.

Steel Blooms.—There is but little doing in these. We quote at £3. 12/6 for 7 x 7, f.o.b. at N. W. England shipping point.

Steel Billets.—The market quiet, but steady. Bessemer, 2¼ x 2¼ inch, £3. 17/6, f.o.b. at N. W. England shipping point.

Steel Slabs.—A moderate business at previous prices. Bessemer, £3. 17/6, f.o.b. at N. W. England shipping point.

Steel Wire Rods.—Business moderate, but prices steady. Mild Steel No. 6 quoted at £5. 16/ and No. 5 at £5. 14/, f.o.b. at N. W. England shipping point.

Old Rails.—Rather more demand; prices steadier. Tees quoted at £2. 17/6, and Double Heads £2. 18/9, c.i.f., New York.

Scrap Iron.—Very little demand. Prices nominal. Heavy Wrought quoted at £2. 7/6 @ £2. 10/, f.o.b.

Crop Ends.—Small sales only at former prices. Bessemer quoted £2. 5/ @ £2. 7/6, f.o.b.

Tin Plate.—The market strong in tone. Offerings moderate. We quote, f.o.b. Liverpool:

IC Charcoal, Allaway grade	14/9 @ 15/3
IC Bessemer steel, Coke finish	13/3 @ 13/6
IC Siemens " " "	13/6 @ 13/9
IC Coke, B. V. grade	13/ @ 13/3
Charcoal Terne, Dean grade	13/ @ 13/3

Manufactured Iron.—There is a good business at firm prices. We quote, f.o.b. Liverpool:

	£	s.	d.		£	s.	d.
Staff. Ord. Marked Bars	....			@	7	10	0
" Common "	....			@	5	0	0
" Bl'k Sheet, singles	....			@	6	15	0
Welsh Bars (f.o.b. Wales)	4	12	6	@	4	15	0

Tin.—Firm market with good trading. Straits quoted at £92. 10/ @ £92. 15/, spot, and £93 @ £93. 5/ for three months' futures.

Copper.—Market firm, but quiet; Chili Bars, £81. 17/6 @ £82, spot, and £78. 5/ @ £78. 10/ three months' futures. Best Selected, £76 @ £76. 5/.

Lead.—More business and prices firmer. Soft Spanish, £13.

Spelter.—Strong market and the demand good. Silesian, ordinary, £17. 5/ @ £17. 6/.

Imports.

Hardware, Machinery, &c.

Bernard, Geo., Ironwork, cs., 27
Baur, C. Vom, mdse., cs., 14
Boker, Hermann, Arms, cs., 36; Mdse., cs., 20; Iron Chains, cks., 20
Clark Thread Company, Mach'y, pkgs., 61
Dinglestedt & Co., ironware, cse., 1
Downing, R. F. & Co., Ironware, cs., 4
Erie Despatch Company, Mach'y, cs., 10
Field, Alfred & Co., Anvils, cs., 23; do., 69; Mdse., pkgs., 6; do., cs., 40
Forschimer, C. & Co., Ironware, cs., 9
Fuller, A., Mach'y, box, 1
Folsom, H. & D., Arms, cs., 21
Graef Cutlery Company, Iron Chains, cks., 10; Cutlery, cs., 7
Godfrey, C. J., Arms, cs., 10
Hartley & Graham, Arms, cs., 92
Keajevoski & Pesant, Mach'y, pcs., 22; do., bxs., 2; Iron Rollers, 6
Korting Gas Engine Company, Mach'y, cs., 4
Lalance & Grosjean, Mdse., cs., 6
Merchants' Despatch Company, Arms, cs., 17
Rose, L. P., Machines, cs., 2
Schoverling, A., Arms, cs., 4
Shoverling, Daly & Gales, Arms., cs., 3
Sheldon, G. W. & Co., Hdw., cs., 8
Schultz, E. L. C. & Co., Mach'y, pkgs., 2
Taylor, James, Mach'y, cs., 2
Wiebusch & Hilger, Lim., Mdse., cs., 62; Arms, cs., 3; Iron Chains, cks., 26.
Witte, John G. & Bro., Cutlery, cs., 8
Order: Wrought Iron Boiler Tubes, 1224; Mach'y, pcs. and pkgs., 144

The St. Louis Wire Mill Company and Braddock Wire Company.

The St. Louis Wire Mill Company, of St. Louis, Mo., are exceedingly busy, being over a hundred carloads behind their orders, with not a carload of any one kind of wire on hand. They are working day and night, and have shut down only three days this year. Barb wire is being shipped as fast as it comes from the machines. They are now operating 130 barb-wire machines in their St. Louis plant, of which 50 are being run on Gliddin wire, and 17 more Gliddin machines have been contracted for, which will be delivered in September. Two galvanizing pans are now in use and a third is being added. A 36-arc electric light plant was put in the works recently. They now make their own paint, which was found necessary because they could not get a uniform quality. It is made in a new fire-proof building specially erected for this purpose, 22 feet by 30 feet, constructed of brick and iron, one story high. The material is bought in carloads, and an average of ten barrels a day is used. In the wire-nail department 50 machines are operated, making all sizes, from ¼ inch long of No. 20 wire to 12 inches long of No. 00 wire. All nails up to No.

20 are sorted by hand, employing 36 sorters, 18 on each turn. A new shipping warehouse has lately been completed. It is located on the Bridge and Tunnel Railroad, over which all trains pass in and out of St. Louis. Its size is 100 x 172 feet, one story high, the sides being constructed of corrugated iron, and the whole building covered with a gravel roof with numerous skylights. Six cars can be loaded here at one time, and as many as 30 cars have been loaded in a day. There are 425 hands on the pay roll in all departments. Special care is given to the comfort of the employees, an instance of this being the recent erection of a bath tank for their use, in the basement of one of the main factories. It is 16 feet long, 8 feet wide and 4 feet deep, lined throughout with zinc, and running water of even temperature will be supplied to it the year round. Ample dressing rooms have also been provided. The officers of the company are as follows: William Edenborn, president; J. W. Gates, vice-president; A. Clifford, treasurer; C. H. Rowe, secretary.

The stockholders of the St. Louis Wire Mill Company are also interested in the Braddock Wire Company, whose works are at Rankin, Allegheny County, Pa. They manufacture wire rods, plain wire and barb wire. At present 36 barb-wire machines are in use in this plant, but 14 more will be added in September. The total annual capacity of the barb-wire departments of these two companies is 30,000 tons, or about one-sixth of the capacity of the entire country. Improvements have just been completed in the rod mill at Rankin, which add greatly to its efficiency and dispense with a number of workmen formerly considered necessary. This is accomplished by an arrangement of iron troughs or guides, which extend on both sides of the rolls. When the billet is inserted the resulting rod enters a trough, which curves round to the next pass, then enters a trough curving in a similar manner to another pass, and so on until it is rolled to the required gauge, when it is for the first time caught by a workman who attaches it to the reel. The troughs, of course, increase in length as each pass reduces the size of the rod. New heating furnaces have also been put in, and the officers of the company claim that they now have the best rod mill in America. It is true that they use four engines at Rankin, while only one is used in the new rod mill at Joliet, but an advantage is claimed for the former in that respect, as with one engine the relative speeds of the trains are fixed, and, as the rolls in some places wear more than in others, it is desirable to be enabled to speed up or reduce the speed of the various trains independently, which is accomplished best by separate engines. The Joliet engine is a compound condensing engine, which is very economical in fuel, and this feature is a strong recommendation for its use wherever fuel is not very cheap. At Rankin this is not a matter of so much importance. Both mills take a 4-inch billet, and make 18 passes to a No. 5 rod, and consequently about the same power is required in each case, whether furnished by one or by four engines. The sales department of both the Braddock Wire Company and the St. Louis Wire Mill Company is at 821 South Twenty-first street, St. Louis. The officers of the Braddock Wire Company are as follows: William Edenborn, president; J. W. Gates, vice-president; Thos. W. Fitch, superintendent; Wallace H. Rowe, secretary and treasurer.

President Salomon, of Hayti, is a fugitive under British protection, and the so-called "black republic" is again in control of revolutionists. United States vessels are ordered to Haytian waters.

Hardware.

Business has fallen off during the past week, and the market is considerably duller than at our last writing. Nor is this dullness confined to Hardware, but is characteristic of most other lines of business in this city. Ammunition is about the only line in which there is any great amount of business, this being the time of year which is usually most active in this line.

Wire Nails.

Complaints continue to be made of considerable irregularity, prices for small lots varying between $2.45 and $2.60, from store. A meeting of Wire Nail manufacturers is being held at Cleveland.

Cut Nails.

The New York market continues fairly active, with carload lots on dock selling at $1.85 to $1.90, and small lots from store at $1.90 to $2.

There is a movement on foot among some of the manufacturers of Augers and Bits to form a combination for the purpose of advancing prices. No great progress has yet been made in this direction, but the agitation of the subject has resulted in a firmer feeling among manufacturers.

The Fork and Hoe makers held their annual meeting at Rochester, N. Y., commencing on the 14th inst. and continuing in session three days. The business of the union for the past year was closed up and the association continued for another year upon substantially the same basis as heretofore, the old officers being re-elected. Prices remain unchanged.

Owing to the late advance in Pig Lead the prices of Shot have been advanced 5 cents, making Eastern prices:

Drop, per bag, 25 pounds	$1.30
Drop, per bag, 5 pounds	.31
Buck and Chilled, per 25-pound bag	1.55
Buck and Chilled, per 5-pound bag	.36

Sisal Rope has advanced ½ cent a pound. There is no change in Manila. The market is very firm, with small stocks of Hemp. We quote at manufacturers' prices, subject to 1½ per cent. for cash in ten days.

Manila, ½ inch and larger	11½ cents per lb
Manila, ⅜ inch	12 " "
Manila, ¼ and 5-16 inch	12½ " "
Manila Tarred Rope	11 " "
Manila Hay Rope	11½ " "
Sisal, ½ inch and larger	9¾ " "
Sisal, ⅜ inch	10¼ " "
Sisal, ¼ and 5-16 inch	10¾ " "
Sisal Hay Rope	9½ " "
Sisal Tarred Rope	9¼ " "
Sisal Medium Lath Yarn	8¼ " "

The Stanley Rule and Level Company claim that whatever the weakness of political platforms, or the fate of candidates who step on to them, the carpenters and painters of the country have a sure thing in the new Roofing Bracket illustrated in the company's advertisement to-day. A single glance at the construction of the Bracket will show that it has come to stay. Discount to the trade 20 and 10 off.

The Moore Mfg. Company, of Chicago, were succeeded on the 25th ult. by the Moore Mfg. and Foundry Company, of Milwaukee. The main office of the company is continued at 51 and 53 Franklin street, Chicago. They are erecting at Milwaukee an extensive plant for the manufacture of their line of Hardware specialties, including Door Hangers, Novelty Tackle Blocks, Vises, Differential Pulley Blocks, &c., and will also be prepared to take contracts for light and medium weight Gray Iron Castings, light machine work, forging and japanning. The new works will be put in operation about the 15th of October. An illustrated catalogue is now in preparation, and will soon be ready for distribution

The Nut and Bolt Works of the Lake Erie Iron Company, Cleveland, Ohio, which have been closed since July 1, owing to a disagreement with the men, have started again, the men yielding in their contest with their employers, which was merely as to frequency of payment. Their capacity is 40 tons a day of Bolts and Nuts, and with this production they feel sure of being able to make prompt shipment of orders.

The firm of Woodruff, Miller & Co., Mount Carmel, Conn., have been dissolved and a new partnership formed under the style of Walter W. Woodruff & Sons, composed of Walter W. Woodruff, Arthur E. Woodruff and Harry P. Woodruff.

By an error of the compositor in the Alford & Berkele Company's advertisement last week we made the discount on IXL Shells 40 and 50 per cent., instead of 40 and 5 per cent., which are the correct figures. We trust none of our readers were misled thereby.

The Western Toy Company, 495 to 503 Wells street, Chicago, manufacturers of Bicycles, Sleds, School-desks and furniture, suffered a severe loss by fire on the 15th inst. A number of tools, valuable machinery, and a large stock of partly completed goods were destroyed, entailing a loss of about $5000, fully covered by insurance. Adjoining buildings, containing more costly machinery and a very heavy stock of goods, were saved.

T. T. Roberts, secretary and treasurer of the Decatur Coffin Company, of Decatur, Ill., states that their Eureka Spiral Screw Driver is meeting with increasing popularity both here and abroad. Export orders are now being regularly filled from almost all the principal countries of the world. A recent inquiry came from China, showing that even the inhabitants of the Flowery Land were aware of its good qualities, and proposed to introduce its use among their mechanics.

John Ray, a File manufacturer, of Newark, and who for some 20 years has had a good commercial rating in that city, died by his own hand on the 18th inst. The night before his death he brought home his bank books, and in other respects deliberately arranged the closing of his affairs. As he was not known to be a drinking man his troubles are attributed to a very recent divorce and subsequent marriage. He was 49 years of age.

Low & Woodruff, handling various lines of Hardware specialties at 121 Lake street, Chicago, have been appointed Northwestern agents for the Braddock Wire Company, manufacturers of Wire Rods, Wire, and Barb Wire.

By a reference to the advertisement of John H. Graham & Co, 113 Chambers street, New York, it will be seen that they have added the Birmingham Plane Mfg. Company's Iron Planes, &c., to their important list of agencies.

Organization of Heavy Hardware Jobbers.

An important meeting of the jobbers of Heavy Hardware was held at the Grand Pacific Hotel, Chicago, on the 14th and 15th insts. It was called by the Chicago jobbers, who had issued a circular a week before to the leading jobbers of Heavy Hardware throughout the country, inviting them to be present. Notwithstanding the extremely short notice given, representatives of the trade attended from Buffalo, Fort Wayne, Milwaukee, St. Paul, Davenport, St. Louis and Chicago. Establishments in Detroit, Toledo, Cleveland, Louisville, Peoria and Dubuque were heard from by letter. The object of the

meeting was to devise measures to protect the jobbing trade from the injuries claimed to be inflicted upon them by the various combinations of manufacturers now existing and others in process of formation. The holding of the conference was hastened by the combination now understood to be organizing which will embrace all the manufacturers in the country engaged in producing any class of material entering into the construction of wagons and carriages. The unanimous opinion of the jobbers present at the meeting, and those who sent letters, was in favor of united action for the protection of their business. The proceedings of the meeting were confined to the arrangement of necessary preliminaries. An organization was effected by the election of J. J. Parkhurst, of Parkhurst & Wilkinson, Chicago, as president, and of Charles R. Blake, president of the Sligo Iron Stove Company, St. Louis, as secretary. Resolutions were passed condemning the action of certain combinations of manufacturers, and the secretary was directed to send printed reports of the proceedings to the Heavy Hardware jobbers of the country and invite their co-operation in the movement. As soon as 50 to 75 houses shall have sent in their approval of the objects of the organization another meeting will be called to outline a course of procedure.

While some of the active promoters of the organization are outspoken in their denunciation of combinations, and regard them as unwholesome appendages of the manufacturing business, others are inclined to accept conditions as they find them, so that sweeping action against all combinations on the part of the jobbers' association is hardly to be expected. Their grievances consist, first, in the adoption of uniform price lists by the manufacturers entering into a combination, which price lists are made public, and which put jobbers on an equal footing with consumers able to buy in the same quantity; and, second, in the invasion of the smaller trade by the manufacturers who, in that way, compete directly with the jobbers, their best customers. It is claimed that these questions affect not only the West, in which the manufacturing interests are comparatively undeveloped, but the East, also, in which jobbing houses are still an important factor in the distribution of goods, notwithstanding the proximity of manufacturers. The organization of jobbers will therefore seek to be national in its scope, and will wield a correspondingly powerful influence in effecting the desired reform in manufacturers' prices. Its originators claim that manufacturers gladly make use of the opportunities jobbers offer for the distribution of goods at low cost; that manufacturers recognize jobbers as their best customers for many classes of goods, and that manufacturers are entirely willing to permit jobbers to handle the small trade whose orders are light and whose credit is often a matter of personal honor rather than a favorable rating in a commercial agency's report. The jobbers therefore insist that they are entitled to fair treatment in the matter of discounts, so that they can transact their business with a reasonable profit. Failing to get this, they might as well restrict their operations, discharge their travelers and conduct a purely retail trade.

In this connection the experience of the jobbers of Shelf Hardware is of interest. Some ten years since it was found by the Western jobbers particularly that their business was being seriously interfered with by the broadcast distribution of manufacturers' price lists, naming terms on which goods could be bought by any dealer, whether a jobber or a retailer. At the instance of Chicago jobbers a meeting of the Shelf Hardware jobbers of the West was held, and the Western Hardware Association was formed for the purpose of protecting their interests. This association embraced such a large number of merchants that their complaints were treated with respect by the manufacturers, and the price lists they objected to were corrected with due regard to the jobbing trade. The fact was recognized that the jobbers filled a very important function in the cheap distribution of goods over an immense territory, which the manufacturers were not prepared to supplant or replace. For a long time the association held regular meetings, rotating from Chicago to St. Louis and Cincinnati. Other matters were taken up and settled to the great benefit of the trade. An arrangement was effected, which still continues, whereby the salesmen of any house were not to be enticed to another house. Prices, however, were not regulated by the association, it having been agreed that every momber should be perfectly free to sell as he pleased. In two or three years other effects of the association began to be noted which had not been anticipated. The large jobbers found that the smaller houses in the association were getting the same discounts as themselves and were thus being enabled to gradually build up a trade which threatened in time to become formidable. Manufacturers recognized all members of the Western Hardware Association on an even footing, and carefully treated them all alike. This was not in accordance with the views of the larger jobbers, who did not propose to lose the prominence they had acquired by dint of large capital or long experience. They abandoned the association forthwith and declared that from that time every tub should stand on its own bottom. The prime object of the association had been accomplished, however, and in that respect it was regarded by the jobbers as an entire success.

Trade-Marks.

The following summary of the decision of an important trade-mark case will interest many of our readers:

Brooks & Le Page made and sold a liquid glue under the name of "Le Page's Liquid Glue," and they subsequently formed a corporation—the Russia Cement Company—which they sold out to the other parties, who continued the designation of "Le Page's Liquid Glue" as a trade-mark, under the terms of the sale, which provided for "the right to use the trade-marks belonging to or in use" by the vendor. Le Page afterward advertised that he would make and sell a glue, calling it "Le Page's Liquid Glue," and the Russia Cement Company filed a bill in equity for an injunction to restrain him from using this designation, which it claimed as a trade-mark. The trial court refused to grant the relief on the ground that it prevented the defendant from using his own name in business, and the case—Russia Cement Company *vs* Le Page—was carried to the Supreme Judicial Court of Massachusetts, where the company were awarded a judgment. Judge Devens, in the opinion, said: "Every one has the right to use his own name honestly in his own business for the purpose of advertising it, though he may incidentally injure the business of another, who may suffer a loss for which, however, there is no legal remedy, because, in law, there is no recoverable loss. While this is the general rule, it is also true that one may so sell or part with the right to use his own name as a description or designation of a manufactured article as to deprive himself of the right to use it as such, and confer this right on another. A name used as an adjective of description is not necessarily understood by the public as any assertion that the person whose name is used is the maker of the article. One who has carried on a business under a trade name, and sold a particular article in such a manner by the use of his name as a trade-mark or a trade name as to cause the business or the article to become known or established in favor under such a name, may sell or assign such trade name or trade-mark when he sells the business or manufacture, and by such sale exclude himself from the further use of it in a similar way. A person may be enjoined, therefore, from using his own name as a description of an article of his own manufacture, and from selling the article under that particular name when he has parted with the right thus to apply it. It is not upon the ground of invasion of the trade name adopted by another, but by reason of the contract he has made, that he is deprived of the right himself to use his name as all others of the same name may use theirs. By the sale to the company of the right to use the trade-mark of the business they had bought from Le Page and his associate, the exclusive right to use the term 'Le Page's Liquid Glue' for such an article passed to it, and the injunction must be granted."

Competition in Ciphers.

Every retailer requires a system for marking goods. Wholesalers also sometimes need something of the kind, although price lists and discounts for the most part meet their requirements. Where retail prices are marked in plain figures, as is becoming very popular nowadays, there is needed some other system for recording cost price. Ciphers are in very common use for this purpose, as well also for marking selling prices, where plain figures are not employed. The number of ciphers in use must be very large. After reflecting upon this fact, and making out a short list by way of experiment, we have decided to interest our readers in gathering together those that are in use, as well also as inventing new ones. In carrying out this idea we propose some cash prizes to those who shall send in, before October 1, 1888, the largest lists of ciphers for marking goods, all subject to the terms and conditions named below.

At the outset, and in order to make our meaning perfectly clear, we may refer to one or two ciphers in common use. One that is perhaps in as general employment as any is "Blacksmith." Another is "Complaints." These words illustrate the requirements. The word used for the cipher must have 10 letters, and no letter must be used more than once. Each letter assumes the numerical value of its order in the word. For instance, in the first case, B is 1, L is 2, A is 3, and so on. Sometimes phrases are used, but they are not considered as good as a single word for the purpose. The phrase "I should try" might be employed in this way. Phrases, however, admit of slight variations so easily that they are not considered as reliable as words, and for this reason they are excluded in this contest, as will be seen by the conditions below:

GENERAL CONDITIONS.

1. The lists are restricted to ten-letter words to be found in Webster's Dictionary.
2. Phrases and proper names are excluded.
3. The lists are to be written in columnar form, and on one side of the paper only.
4. The contestants name and address must appear on each sheet of paper used.
5. Vulgarisms and words for any reason deemed unsuitable for publication will be excluded.
6. The competition will close at 5 p. m., October 1, 1888, and lists received after that time will be rejected.
7. All the lists submitted, whether awarded prizes or not, will be subject to publication, at the discretion of the Editor. Contestants names will be published or not published in connection with their lists, according to their expressed preferences.
8. This contest is open to all, there being no restrictions whatever.

PRIZES.

Two cash prizes of $15 and $10, respectively, are offered. To the competitor sending the largest list, in accordance with the conditions above set forth, there will be paid $15, and to the competitor sending the next largest list there will be paid $10. In case of a tie in the largest lists, the whole sum, $25, will be equally divided among the authors of the same.

DECISION.

All the lists submitted will be referred to a competent committee for examination and the award of prizes will be based upon their report. The results of the contest will be published as soon after the decision is made a practicable.

The lists are to be sent by mail, in sealed envelopes, addressed "David Williams, 66 and 68 Duane street, New York," and marked in lower left-hand corner of envelope "Cipher Competition." Matter other than that relating to this contest must not be inclosed in these envelopes, as they may not be opened until in the judge's hands.

To help those who desire to make their lists as large as possible, we submit the following from the Minneapolis *Tribune*, with the suggestion that the answer to the riddle is a word which perhaps would not be otherwise thought of:

"What are all those letters for on all your goods?" asked a customer of a leading druggist.

"They indicate the cost price of the articles," was the reply.

"The cost price, eh?"

"Yes; you take a word of ten letters, no two of which are the same, and you let those represent the digits, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, and there you are."

"I see; and what cipher word did you take?"

The druggist winked and smiled. "I took a word which represents what I aim to make my business. That is all I will tell you. Look around for yourself and find out what you can."

The customer did as he was bid and had soon collected the following list of prices:

	Each.	Per doz.
Nail brushes	e	r p l
Tooth brushes	a	b o
Bird-seed, packages	f	f a
Soap, cakes	i	i l
Cologne, bottles	o t	f p p
Manicure cases	rie	r b l l

From these he found the cipher word. What was it?

Annual Meeting of the Vapor Stove Association.

The annual meeting of the Vapor Stove Manufacturers' Association of the United States was held at the Russell House, Detroit, on the 7th, 8th, 9th and 10th insts. The following members were present: Geo. M. Clark and H. M. Hubbard, of Geo. M. Clark & Co., Chicago; Garson Myers, of the Adams & Westlake Company, Chicago; George Kahle and C. A. Stockstrom, of the Quick Meal Stove Company, St. Louis; E. S. Barbour, E. L. Chamberlain and A. S. Phelps, of the Detroit Stove Works, Detroit; J. B. Hughes, of the Peninsular Stove Company, Detroit; N. A. Wilson, of the Cleveland Stove Company, Cleveland; D. A. Dangler, of the Dangler Stove and Mfg. Company, Cleveland; Wm. M. Lottridge, of the Hull Vapor Stove Company, Cleveland; J. A. Marsh, of the Happy Tidings Stove Company, Cleveland; F. A. Mehling, of the Schneider & Trenkamp Company, Cleveland; W. C. North, of the American Vapor Stove Company, Cleveland; C. A. Pope, of the Aurora Vapor Stove Company, Cleveland; F. L. Alcott, of the Standard Lighting Company, Cleveland. The first day was taken up with the address of President Geo. M. Clark and the dispatch of preliminary business. Mr. Clark's address was as follows:

Gentlemen and members of the Vapor Stove Manufacturers' Association: The anniversaries of great events in the history of nations, corporations or individuals may be so observed as to be of specific value, as they serve to emphasize truth, warn of danger or chronicle success. Were it not for such mile stones as New Years and the anniversaries of our birth, who knows but what time might slip by at such a giddy, unmarked rate that we would be octogenarians before we realized that we had rounded our thirties and millionaires or bankrupts before it had occurred to us to take account of stock. Unfortunately, perhaps, time does not slip by so easily, and we are continually brought up against corners, which serve to remind us that he who does not bestir himself will most certainly be left far behind in this race which we call life. Retrospection and reflection are not always agreeable, but, sometimes, like bitter draughts prescribed by the wise physician, they lead to health. Happy is he who, like this association, of which I deem it an honor to be a member, is called upon to indulge in little besides congratulation.

Allow me in brief words to review the progress of the manufacture of vapor stoves during the last decade and to ask and partially answer the questions, Where do we as an association of vapor stove manufacturers stand today, and what is our reasonable hope for the future? Figures speak with emphatic voice. In 1878 and 1879 1000 vapor stoves of inferior quality were made. Since that date the yearly increase has been from 5000 to 10,000, until in 1887 over 100,000 were made and sold. For 1888, without doubt, the number manufactured will reach from 120,000 to 125,000. The sale is increasing in the New England States, in California and the South. Owing to the security against accident given by continual improvement in construction, the prejudice of insurance companies to the use of gasoline stoves is gradually yielding, and, in time, will undoubtedly disappear.

Surely it is admissible that in the freedom of this gathering we should congratulate ourselves upon our substantial progress and standing. I quote, for our satisfaction, these words from a recent address before the National Association of Stove Manufacturers: "We, as manufacturers of a legitimate line, must conclude that it has been thoroughly demonstrated that gasoline and vapor stoves materially decrease our spring sales in the line of cook stoves and ranges." I believe that our association rests on a solid basis. Every effort should be made by the members to insure the strict maintenance of prices and discounts. Quite a number of regular stove manufacturers and jobbers have had a gasoline stove made for them, they themselves having no practical knowledge of the construction, or of the necessity of the most accurate workmanship on burners and correct construction throughout. This has been the occasion of some complaints which have reached me, to the effect that prices have been cut by jobbers. This cutting has arisen from jobbers having purchased a larger quantity of stoves than they have been able to dispose of, or the quality has not been up to standard. To meet this difficulty, therefore, I would suggest a smaller discount to jobbers than has heretofore prevailed, hoping that this will lessen the number of jobbers and thereby lessen the temptation to cut prices.

Allow me to say a word in regard to a subject with which the very air seems charged. I refer to trusts. Copper trust, tin trust or corner—what need is there of a trust on an article that is not even produced in this country except in very small quantity—lead trust, iron trust, soap trust, glass trust, linseed-oil trust, &c., &c. A trust on a metal or any manufactured article is usually for the purpose of reducing production and thereby forcing prices to a point above the normal. This is adverse to the public interest, and in the nature of things cannot continue. Allow me to quote from a recent writer on the trust system: "Only a short time will be required to develop its weak points, and, notwithstanding popular apprehension, it will be found that such combinations cannot rise superior to supply and demand, action and reaction, world-wide competition, and all the natural forces, which, though silent, are sovereign and continuous. There are penalties for the violation of natural laws, and, though often apparently slow, they are sure, because inherent in the nature of things. Indirect, regulative influence and unexpected compensations make their presence felt, and finally assert their supremacy over all artificial combinations."

I believe we can as an association so reduce the list price on our goods that the consumer can procure a gasoline stove or range at a lower price than heretofore. With a smaller discount to jobbers, the manufacturer would receive the same price for his goods sold through a jobber as formerly. I would recommend a reduction from our present list of .....* each on all high stoves, and .. ...* each on the regular junior. I would also recommend the discontinuance of the manufacture of all cheap junior stoves. No doubt your several committees have come prepared to report on matters which are vital to the interests of our association. I hope we can begin work at once and that this annual meeting arrange a list of prices, with discounts that can be maintained.

The following officers were elected for the ensuing year: President, A. S. Phelps; vice-president, Wm. Lottridge; secretary and treasurer, Garson Myers; Executive Committee, Geo. M. Clark, Geo. Kahle, D. A. Dangler, F. A. Mehling and F. L. Alcott.

* The speaker omitted to fill in the blanks representing reductions.

The report of the Executive Committee was taken up section by section and its consideration occupied the remainder of the day and the sessions of the day following until adjournment. The question of prices was thoroughly discussed and conclusions were reached on every point raised. In the new list for next year the so-called step stoves are made to list $17, $19 and $21 respectively for the two, three and four burner, which prices are for the stove only. The prices on two, three and four burner stoves, with ovens attached under the top, were reduced $1 each from the list price of last year. The stoves made with self-lighting or heating tube attachments will be listed 50 cents higher than stoves without attachments. The regular and quantity discounts remain the same as last year. It is the purpose of the association to acquire the control of the Consolidated Vapor Stove Company, and with this in view a committee was appointed to confer with that company on a form of contract which the members of the association agreed to, and which it is believed will be accepted by the company. If this is consummated the licensing power and control of the association will be in the hands of the manufacturers of vapor stoves instead of with the Consolidated Company, while all litigation and enforcement of the licenses will rest with that company, who will be controlled by a litigation committee composed of two members of each body, and if they shall not be able to agree on a policy, an application is to be made to some judge of an Ohio Court to appoint a fifth member of the committee, with power to cast a deciding vote. Measures will be taken to insure the enforcement of the agreement which are expected to be equally efficacious with both the manufacturers and the jobbers.

There were present at the session on Thursday morning Walter B. Mosman, of the Pratt Mfg. Company, 26 Broadway, New York, a branch of the Standard Oil Company, and O. J. Benham, of the naphtha department of the Standard Oil Company, both of whom were interested in the further development of the vapor stove business in providing an increased channel for the consumption of gasoline. Mr. Mosman made some remarks relative to the use of vapor stoves in New England and other Eastern States. He showed that the prejudice which had been supposed to exist in that section against vapor stoves was entirely due to a lack of information among the people relative to an article so different from anything they had heretofore used, and not to the hostility of the insurance companies. Under proper regulations the insurance companies permitted the use of gasoline, and it rested with the manufacturers of vapor stoves to acquaint the people of the East more thoroughly in relation to their use, and thus advance their mutual interest. He had no doubt that if the necessary steps were taken by manufacturers and jobbers to instruct the people in regard to the merits and advantages of vapor stoves a larger consumption of them would follow in the Eastern States. At the conclusion of his address the president was directed by vote of the association to appoint a committee to act with Mr. Mosman in this matter.

From information given by those present at the meeting it is believed that the quantity of vapor stoves made and sold in this country during the season of 1888 was easily 20 per cent. more than last year. The character of the stoves sold this year reached a higher degree of perfection than at any time in the past. In new territory, such as Texas and other Southern States, also throughout New England and other Eastern States, vapor stoves are getting a strong foothold by means of the introduction of the small, or as commonly called

cheap, junior stoves, which are meant to take the place of kerosene stoves, that have had such a large sale in the sections referred to. Wherever the small gasoline stoves have been sold for one or more seasons a good market is opened up for the full-fledged latest-improved gasoline stoves. The hope was expressed at this meeting that the stove dealers of the East would investigate for themselves the real merits of the vapor stove and be convinced of their own volition and not wait for the manufacturers to remove their doubts.

As the formation of a vapor stove trust has been talked about to some extent, and it was expected that definite action of some kind would be taken at this meeting, it should be stated that the matter was discussed, but all efforts in that direction were abandoned, as the scheme was demonstrated to be wholly impracticable. There will be no trust in vapor stoves so long as the present manufacturers have control of the trade.

The next semi-annual meeting of the association will be held at St. Louis on the first Tuesday in March, 1889.

Louisville Trade Items.

The following reaches us from Louisville under date of the 18th inst.:

The volume of the Hardware trade of Louisville, Ky., is not only up to that of last week, but is gradually increasing. The tone of the market has improved, and the large forces of clerks in the jobbing houses are kept unusually busy for this season of the year shipping out orders. Prices are still too low, with no prospect of a general advance. Sharp competition was instituted by the manufacturers early in the season, and it results in the jobbers practicing among themselves what they learned from such a demoralized school. Bnt as each and all the dealers are well satisfied with the status of trade, and say that business is good, no one can censure them for giving their customers the benefit of low-priced goods. In fact, it is better so; the farmer gets very small returns for his work, investments of money and labor, and it is but right that he should be able to buy cheap tools and implements.

As some manufactured goods, such as Cut Nails, Bar and Sheet Iron, become a little scarcer, and the demands on the jobbers' stocks continue to increase, the dealers acquire more confidence and are quietly placing large orders, covering future probable needs. The manufacturers will not gain anything by further concessions, and now that many of them will be affected by the advance in Pig Iron the buyers hope to see them hold firm. An occasional healthy tone is given to the trade, like the recent advance in Lead, which has netted a snug sum to those dealers who were not afraid to buy at the right time. One house alone purchased eight or ten carloads of Shot; half of this they have sold at the advance, with the balance held in reserve on the approach of the best season. Lead has been selling too low, not sympathizing with Copper and other metals, and the present rise is owing to greatly reduced output, caused by low values. Other Ammunition is being taken in and shipped out in large quantities, especially Blasting Powder, this city being the source of supply for a large territory in railroad and mining operations, and considerable amounts of Blasting Powders are used in the extensive limestone quarries through this region

Cut Nails are going out in good lots from store, and many stocks are being depleted. Some of the regular mills are unable to fill orders, as their stocks are badly broken, machinery idle and likely to remain so until prices improve a little. Wire Nails hold their own well, the store orders increasing. Barb Wire shows a large consumption, not for political fences, however, as the approaching canvasses might indicate; it is too dangerous a thing to straddle, but marks a steady improvement in putting up cheap and durable fencing.

The Outlook for Stoves.

The Metal Worker of last week speaks as follows as to the outlook of the Stove trade:

With the prospect of a large fall demand for stoves, it is not strange that leading manufacturers should be anxious about the maintenance of prices. We believe that prices are being sustained in almost all directions, although occasionally we encounter the announcement of what might be considered a step calculated to demoralize the trade. For example, a Western foundry in a trade circular referred a short time since to the reduction in cost of Pig Iron as being a reason why stoves can be sold more cheaply at the present time than formerly. The sober second thought of every manufacturer and dealer must be to convince him that the slight reduction in Pig Iron can have but very little effect in the cost of Stoves. Pig Iron, while it is the principal material entering into Stoves, by no means represents their entire cost. Price of Stoves, in view of all the circumstances attending the trade, are low at the present time, rather than high, and buyers very generally are willing to pay the prices that are asked. What the dealer is most concerned in is that prices should be maintained. It is demoralizing to the trade to meet figures later in the season that are lower than those which were demanded when the earlier stock of goods was bought. Many Stove foundries, in order to avoid the rush of the fall trade, are urging their customers to send in early orders. This suggestion is being acted acted upon by many to the mutual advantage of all concerned, and for their protection as well as for other reasons prices should not fluctuate.

Arrangement of Stores.

The accompanying illustration, Fig. 261, shows a method of ceiling hangings adopted by J. P. Casselman, Grand Forks, Dak., which will be recognized as a modification of a plan we have heretofore described. The cut shows stringers made of 1-inch lumber, 2 inches wide, which run lengthwise to the store. They are suspended to the ceiling by ¼-inch iron rods screwed in the ceiling, the lower end being bent so as to hold the stringers. These rods are about 7 feet apart. The outer stringers are placed on the lowest down, the others rising as they approach the center, thus making an arch which when filled with Tinware and similar goods that can be appropriately hung up is referred to as presenting a fine appearance and giving a store the effect of being heavily stocked. Common screw hooks are placed in the stringers at such distances as the ware requires, 6, 9 or 12 inches apart. Connecting the ends of the stringers, as shown in the cut, is referred to as improving the effect, giving it more the appearance of an arch.

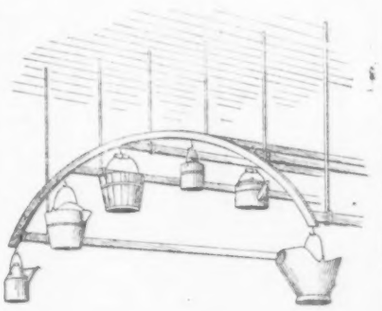


Fig. 261.—Arched Ceiling Hangings.

Convenient Rule for Marking Goods.

From time to time during the past few months there have appeared in these columns a number of communications from correspondents on the general subject of system in the marking of goods usually carried in stock by the retail dealer. Those who follow this practice put such prices upon their goods as will secure in one case 25 per cent., in another 33⅓ per cent., and perhaps in still another 40 per cent. The task of computing the price at which an article must be sold to return a certain percentage profit, while not difficult, consumes valuable time, and any means looking to facilitating the operation cannot fail to be appreciated. It also happens that the dealer may attend an auction sale and desire to bid upon certain lots of goods which are offered by the dozen. Now, in buying, says an exchange, he knows exactly what one of these articles will retail for in the market where he deals; and, unless he is a good accountant, it will often take him some time to determine whether he can make a living profit by buying them at a given figure and selling them by the single article at market price. In buying his goods by auction, as the merchant often does, he has not the time to make the calculation before the goods are bid off. He, therefore, loses the chance of making good bargains by being afraid to bid at random, or if he bids, and the goods are cried off, he may have made a poor bargain by bidding thus at a venture. It then becomes a useful and practicable problem to determine instantly what per cent. he would gain if he retailed the article at a certain price. To tell what an article should retail for to make a profit of 20 per cent.:

RULE.—Divide what the article cost per dozen by ten, which is done by removing the decimal point one place to the left.

For instance, if shovels cost $17.50 per dozen, remove the decimal point one place to the left, making $1.75, what they should be sold for each to gain 20 per cent. on the cost. If they cost $31.00 per dozen they should be sold at $3.10 each, &c. We take 20 per cent. as the basis, for the following reasons: Because we can determine instantly by simply removing the decimal point, without changing a figure, and if the goods will not bring at least 20 per cent. profit in the home market the merchant cannot afford to purchase, and should look for cheaper goods.

The reason for the above rule is obvious. If we divide the cost of a dozen by 12, we have the cost of a single article; then if we wish to make 20 per cent. on the cost, we add the per cent, which is ⅕, to the ⅝, making ⅚ or 1⅔; then as we multiply the cost divided by 12 by the 1⅔ to find at what price one must be sold to gain 20 per cent., it is evident that the 12s will cancel and leave the cost of a dozen to be divided by 10—to do this remove the decimal point one place to the left. As removing the decimal point one place to the left, on the cost of a dozen articles, gives the selling price of a single one with 20 per cent. added, and, as the cost of any article is 100 per cent., it is obvious that the selling price would be 20 per cent. more, or 120 per cent., hence to find 50 per cent. profit, which would make the selling price 150 per cent., we would first find 120 per cent., then add 30 per cent. by increasing it one-fourth itself; for 35 per cent. increase it one-eighth itself, &c. Hence to mark an article at any per cent. profit we may use the following:

GENERAL RULE.—First find 20 per cent. profit by removing the decimal point one place to the left on the price the articles cost per dozen; then, as 20 per cent. profit is 120 per cent., add or subtract from this amount the fractional part that the required per cent. added to 100 is more or less than 120. Merchants, in marking goods, generally take a per cent. —that is, an aliquot part of 100, as 25, 33⅓, 50, &c. The reason they do this is because it makes it much easier to add such a per cent. to the cost—for instance, a merchant could mark almost a dozen articles at 50 per cent. profit in the time it would take him to mark one at 49 per cent. The following is arranged for the convenience of business men in marking the prices of all articles bought by the dozen.

To make											
20 %	move	point	1	place	to	left.					
80 %	"	"	"	"	"	"	and add	⅕	itself.		
60 %	"	"	"	"	"	"	"	"	½	"	
50 %	"	"	"	"	"	"	"	"	¼	"	
44 %	"	"	"	"	"	"	"	"	1-5	"	
40 %	"	"	"	"	"	"	"	"	1-6	"	
37 ½	"	"	"	"	"	"	"	"	1-7	"	
35 %	"	"	"	"	"	"	"	"	⅙	"	
33⅓ %	"	"	"	"	"	"	"	"	1-9	"	
32 %	"	"	"	"	"	"	"	"	1-10	"	
30 %	"	"	"	"	"	"	"	"	1-12	"	
28 %	"	"	"	"	"	"	"	"	1-15	"	
26 %	"	"	"	"	"	"	"	"	1-20	"	
25 %	"	"	"	"	"	"	"	"	1-24	"	
12½ %	"	"	"	"	"	subtract			1-16	"	
16⅔ %	"	"	"	"	"	"			1-36	"	
18¾ %	"	"	"	"	"	"			1-96	"	

New Champion Force Pumps.

The New Champion force pump, manufactured by Clark Bros., of Belmont, N. Y., is well known to the trade, and has heretofore been illustrated in these columns, but some of the late improvement brought out by this firm will be of special interest to pump dealers, and particularly those having trade in pumps for drilled wells. The accompanying cut, Fig. 1, represents a pump designed for drilled wells of 4-inch bore and larger. It is constructed with an outer case or shell, in which the upper brass cylinder is suspended. This case or shell is just large enough to pass readily into 4-inch casing. The discharge-pipe, and a pipe on the opposite side serving as an additional support to the working parts of the pump, are screwed into the upper end of the shell

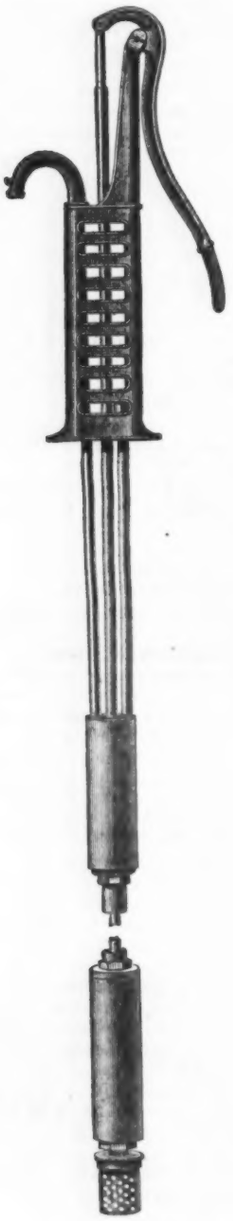


Fig. 1.—New Champion Drilled Well Force Pump.

and are connected above to a cast-iron standard of neat design, and which has been constructed with a view to securing the greatest strength with the least weight of material. The firm have been using this form of standard on all their force pumps for the past two years. The operation of this pump is the same as that of the regular New Champion, one-half the water being discharged in the up stroke of the handle and the other half in the down stroke, and the stream is made continuous by means of the hollow piston-rod

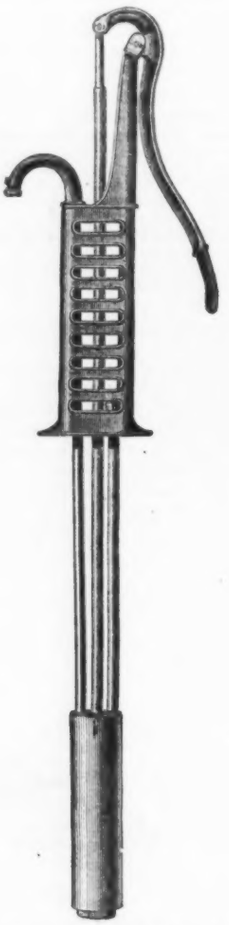


Fig. 2.—New Champion Set Length Force Pump.

air-chamber. The use of the outer case or shell is to inclose the upper cylinder and form a waterway around it to communicate with the discharge-pipe, and also form a connection for the well-pipe, which communicates with a lower cylinder placed at or near the bottom of the well. This lower cylinder is either seamless brass or iron, porcelain lined, as may be preferred by the user; but whether of brass or iron it is always fitted with a brass valve seat. This pump is also fitted with windmill attachment. Fig. 2 represents a pump constructed on the same general plan as Fig. 1, but having the upper and lower cylinders both contained in the case or shell, thus adapting it to be used as a set-length pump for shallow drilled wells. The firm also manufacture a pump having the same working parts as in Fig. 1, but slightly modified in form to adapt it for wells of smaller bore than 4 inches.

Tanner's Patent Telephone Attachment

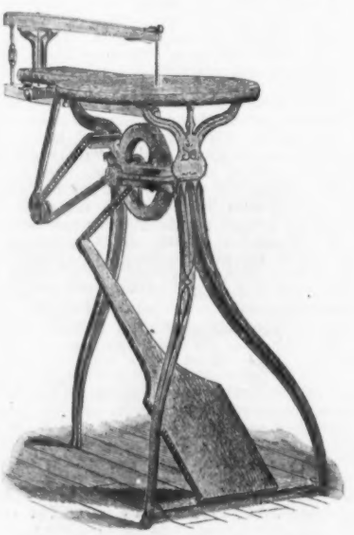
Among the specialties brought out by the E. S. Greeley Company, No. 5 Dey street, New York, is Tanner's patent telephone attachment, a general view of which is shown in the accompanying illustration. The general shape of the attachment, as well as its peculiar features, are so well displayed in the cut that but few words of explanation are necessary. It will be noticed that it is provided with an air chamber separate from the speaking-tube. The broken part in the cut shows the extension of the speaking-tube, while surrounding it is the air-chamber. The perforations in the back are said to relieve concussion and avoid the rattling of the transmission diaphragm, which destroys the value of the sound vibrations produced by the voice. With the use of this attachment it is claimed that conversation can be carried on in an ordinary confidential tone. The device is made of brass, nickel-plated and highly polished. As will be seen by the cut, no screws are required to fasten it in place, as it clamps automatically to the transmitter box. This device

Tanner's Patent Telephone Attachment.

has been on the market comparatively a short time, but, judging from numerous testimonials, it has already met with considerable favor.

Foot-Power Scroll Saw.

The W. F. & John Barnes Company, No. 71 Ruby street, Rockford, Ill., are directing attention to recent improvements which they have made in what they call their No. 7 Foot-Power Scroll Saw. While the general appearance of the machine is not materially changed, the patent perforated belt, of which the company



Barnes' No. 7 Foot-Power Scroll Saw.

make a specialty, has been added, taking the place of other devices not so satisfactory for use. This belt, the company inform us, has the great advantage of driving positively, and yet running so slack over the pulleys that there is very little friction in the transmission of the foot-power. The arrangement of the working parts of the improved machine is simplified, and a less number of parts is used. The company claim that the profit on running one of these machines on ordinary scrollwork at usual rates will pay for the machine in a very short time.

New Coal and Ash Sieve.

A very convenient arrangement for sifting coal and ashes has recently been devised by Mr. H. S. Brewington, of Baltimore, Md., and is being offered the hardware trade by the manufacturers, Messrs. Brewington, Bainbridge & Co., of that city. In Fig. 1 of the engravings herewith presented is shown the device ready for use, except that the drawers

Coal and Ash Sieve.—Fig. 1.—General View of Device with the Two Drawers Pulled Out.

should be closed. In Fig. 2 the coal is being turned from the cylinder into the top drawer. In the construction of this sifter the box at the top is made of wood and provided with a perforated bottom made of galvanized iron. This is made to revolve by means of a spindle, running down through the center of the box and attached to the bottom of the sieve, and is

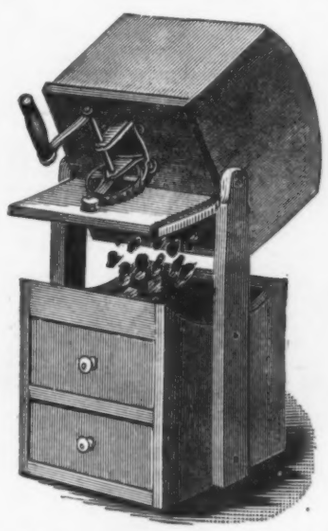
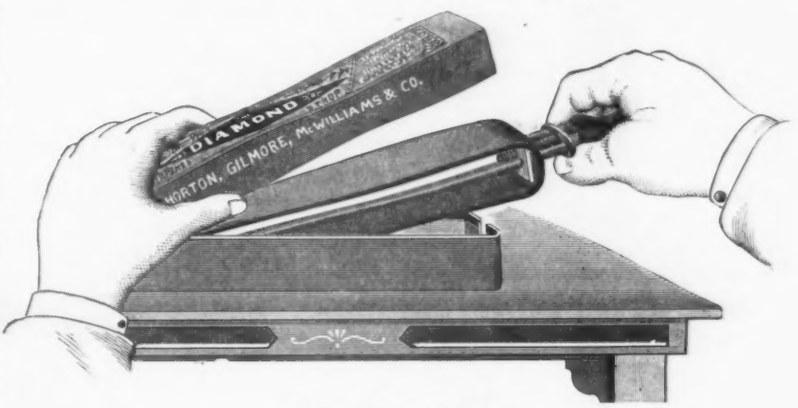


Fig. 2.—Showing Method of Dumping Contents of Box After Ashes Have Been Sifted.

operated by the crank shown in the engraving. The top drawer is provided with a perforated bottom, which also serves as a sieve, while the lower drawer has a tight bottom to hold the ashes. In operating the device the coal and ashes are turned into the box or cylinder containing the revolving mechanism. The cover is closed and the contents are agitated by turning the handle above referred to. The ashes are thus sifted through the bottom of the box, and falling through the first drawer, which is provided with a sieve base, are retained in the lower drawer, from which they may be easily removed. The box is then tilted and the coal is dumped into the top drawer ready for use in the stove. The manufacturers claim that by means of this device a hod of coal or ashes can be sifted in 15 seconds; that it is easily managed, allows no dirt or dust to escape into the room, and will save enough coal to pay for itself in a very few weeks.

The Diamond Finished Razor Strop and Case.

Some new features in a razor strop and case have been produced by Horton, Gilmore, McWilliams & Co., of Chicago, as shown in the accompanying cut. The strop is made of the finest quality of genuine Russian leather, and the preparation with which the leather is coated is what its name implies—"Diamond finished." It is designed to produce the most perfect edge that can be put upon a razor. The case for this strop, as will be seen by the cut, is a new departure. When the sharp, keen substance of the red side of a strop gets mixed with the coating on the black finishing side, the strop is spoiled for putting on a perfect edge. This is what always occurs when the old style of case is used, unless particular care is taken each time on inserting the strop in the case. The new form of case overcomes this objection and forms a perfect protection for the strop. It will be seen that the strop is directly lifted out or put back without rubbing the coated sides. Being hinged at one end, the cover is raised by the act of withdrawing the strop. When the case is closed the strop is held securely in place by friction upon the shank of the handle. The trade-mark and the form of the case are protected by copyright granted to the firm of Horton, Gilmore, McWilliams & Co.



Razor Strop and Case.

Tuerk's New Hose-Band Clamps.

The Tuerk Water Meter Company, of Syracuse, N. Y., are putting on the market Tuerk's new hose-band clamps, two views of which are shown in the accompanying illustrations. An important claim made for this clamp is that it can be relied upon to stand any pressure without getting loose or allowing the hose to leak. Fig. 1 illustrates the clamp screwed partly together. It will be very easily noticed that the special feature of the clamp is the overlapping tongues which slide together between the lugs, thus forming a continuous band and holding the hose as securely between the lugs as at the other parts of circumference. The tongues and clamps are cast all in one piece, one tongue projecting from each lug of the clamp. In Fig. 2 the clamp is shown drawn tightly around the hose. The tongues at C force themselves between the hose and the clamp, and keep the hose

Tuerk's New Hose-Band Clamps.—Fig. 1.—Clamp Screwed Together.

pressed down firmly, thus preventing al danger of coming off or leaking, which was the objection encountered in the old style of clamp. Tuerk's hose-clamps are made in 11 different sizes, from ½ to 3 inches inclusive, and are manufactured to suit different ply hose. The Tuerk Water Meter Company will also manufacture odd sizes where desired.

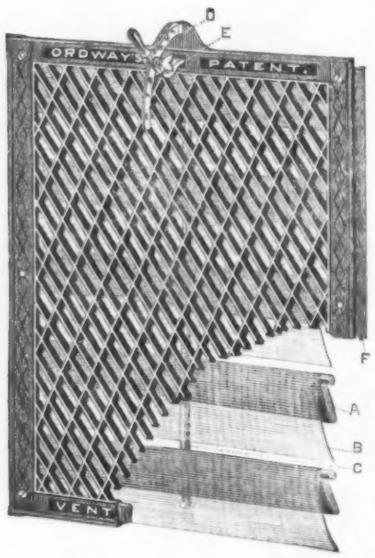
The city of Providence by the free use of water meters has reduced the consumption of water to 38.9 gallons, about two-

Fig. 2.—Clamp in Position on Hose.

fifths the American average in our cities. The use of meters is secured by making the water rate to those who put them in about two-thirds of what it is to those who use water without a meter. The expense of providing the meters is small and their inspection costs little.

Improved Ventilating Register.

A novel ventilating register, a general view of which is shown in the engraving presented herewith, is being placed upon the market by the Chicago Heating and Ventilating Company, of 205 West Madison street, Chicago, Ill. The device is the invention of Ira J. Ordway, president of the company, and is so arranged as to allow air to pass from the room into the ventilating flue, but prevents the air moving in the opposite direction. Referring to the engraving, A represents wooden slats to which flexible valves B are attached. The various slats, A, are fastened to the rod C at their rear side, after the same manner as ordinary window shutters are attached. The lever D, shown in the upper part of the engraving, is firmly attached to the upper wooden slat. By means of the lever B, in connection with the thumb-screw E, the slats A can be so placed or set as to regulate the quantity of air that shall be delivered into the ventilating flue. The ventilator is constructed of cast iron with a face finished in japan, nickel or bronze as may be preferred. It is attached to a wooden frame in which the slats are pinioned at its face. On the front of the slats are fastened the floating valves B, made of oil silk or other light flexible material, which entirely cover the inner face of the register when they are closed upon it by a down current of air, but are carried back by the movement of the air when the current is from the room into the flue. The inventor claims that ventilation is greatly facilitated by this device, as the air being held in the flue instead of forcing its way into the room soon becomes warmer than the outside air, and thus establishes an upward current, which draws with it the air from the room.



Ordway's Ventilating Register.

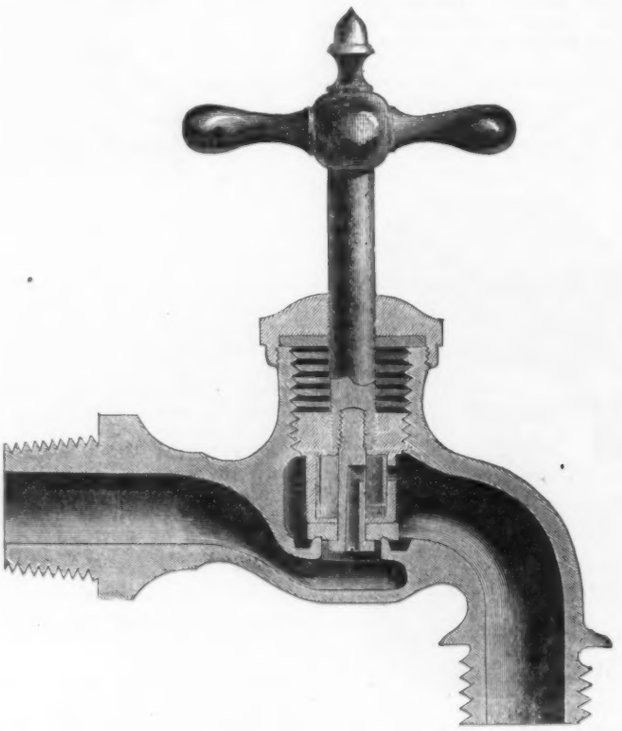
Improved Hollow Punch.

Some time since we directed attention to the self-centering hollow punch introduced by W. J. Rothweiler, of Newport, Ky. Quite recently the tool has been very materially improved, and is now being put out in the form shown in the accompanying engraving. The cutter is made removable and accordingly is interchangeable. As is well known to all metal workers the cutting edge of a hollow punch suffers from two causes—first, from the effort to dislodge punchings that have been forced into the cavity, and, second, from sheer carelessness or abuse. The first of these, it is claimed, has been rendered impossible in the present tool by the automatic extractor. On the other hand, the damage from carelessness, however severe, with the use of this punch necessitates ordering simply a new cutter, and does not make it necessary to throw away the entire tool as is the case with other articles of its kind. By this means two-fifths of the cost, it is claimed, is saved. The other good points about the tool embrace the following: Four sizes of handles answer for all sizes of cutters, and a change of cutters may be made in a few seconds of time. Referring to the engraving, it will be noticed that there is a projecting point or center, which makes it very convenient to locate the punch at the desired point to be cut. With the old style of punch this was very difficult to do. The shank is of octagon cast steel as at present manufactured; it was formerly made round. The cutters, which were formerly in one piece, are now in two and are made of English cast steel. The centering pin is 1 inch long.

Improved Hollow Punch.

Clark's Patent Wasting Faucet.

The E. Stebbins Mfg. Comapany, Springfield, Mass., are putting on the market Clark's patent Self-Wasting Faucet, a sectional view of which is shown in the accompanying cut. Referring to the illustration, it will be noticed that the lower part of the spindle of the bibb is drilled out, leaving a small air-chamber just above the seat, and there is also a small hole opening into the nose of the bibb. On the inside of this air-chamber there is a small piece of rubber packing covering the entire surface. Through the head of the screw that holds the packing of the spindle there is a small hole opening into the air-chamber above mentioned. When the water is turned on it enters through this hole into the small air-chamber in the bottom of the spindle and presses the rubber packing against the small hole in the side of the air-chamber so that the appliance works like an ordinary compression bibb. When the water is turned off at the stop in the basement, or wherever it may be located, the pressure being off the packing in the air-chamber, the air is at once drawn in through the nose of the bibb and the small hole inside of the air-chamber into the pipe, and all the water runs out at the waste of the stop in the basement. The bibb, however, not being opened is ready for the water when it is again turned on, thus giving it the double advantage of avoiding the danger of water remaining in the pipe and freezing, and also of water escaping from the bibb left open when the water is turned off, and not closed when the water is again turned on. The manufacturers inform us that the cost of Clark's patent Self-Wasting Faucet is but a trifle more than an ordinary bibb. They also state that they furnish samples upon application.



Sectional View of Clark's Patent Self-Wasting Faucet.

A syndicate composed of a number of well-known capitalists of Pittsburgh are negotiating for the purchase of the University building in that city. If successful the structure will be torn down and a magnificent building similar in architectural construction to the Lewis block will be erected thereon. The new structure will be six stories high, and it is proposed to make it one of the model office buildings of the city.

CURRENT HARDWARE PRICES.

AUGUST 22, 1888.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers at the figures named.

Ammunition.

Caps, Percussion, ₩ 1000—
Hicks & Goldmark's
F. L. Waterproof, 1-10's ..... 50¢
E. B. Trimmed Edge, 1-10's ..... 66¢ } dis 25@ 25&
E. B. Ground Edge, Central Fire, 1-10's, 70¢ }
Double Waterproof, 1-10's ..... $1.40 } 7½ %
Musket Waterproof, 1-10's ..... 50¢
G. D. ..... 28¢
S. B. ..... 30¢
Union Metallic Cartridge Co.
F. C. Trimmed ..... 60¢ } dis 25@ 25&
F. L. Ground ..... 65¢ }
Cen. Fire Groun ..... 70¢ } 7½ %
Double Waterproof ..... $1.40 }
Double Waterproof in 1-10's ..... $1.40 }
S. B. Genuine imported ..... 45¢
Eley's E. G. ..... 54¢ @ 55¢
Eley's L. Waterproof, Central Fire $1.60

Cartridges—
Rim Fire Cartridges ..... dis 50&5&2 %
Rim Fire Military ..... dis 15&2 %
Central Fire Pistol and Rifle ..... dis 25&5&2 %
Central Fire, Military & Sporting ..... dis 15&5&2 %
Blanx Cartridges, except 22 and 32 cal., an additional 10 % over above discounts.
Blank Cartridges .22 cal ..... $1.75, dis 2 %
Blank Cartridges, 32 cal ..... $3.50, dis 2 %
Primed Shells and Bullets ..... dis 15&5&2 %
B. B. Caps, Round Ball ..... $1.75, dis 2 %
B. B. Caps, Conical Ball, Swaged ..... $2.00, dis 2 %

Primers—
Berdan Primers all sizes, and B. L. Caps (for Sturtevant Shells) ..... $1.00, dis 2 %
All other Primers, all sizes ..... $1.20 dis 2 %

Shot—
First quality, 4, 8, 10 and 12 gauge ..... dis 25&10&2 %
First quality, 14, 16 and 20 gauge ($10 list) ..... dis 30&10&2 %
Star, Club, Rival and Climax Brands, 10 gauge, $9 list } ..... dis 33⅓ %
12 gauge, $8 list } & 10 & 2 %
Club, Rival and Climax Brands, 14, 16 and 20 gauge ..... dis 30&10&2 %
Selbold's Combination Shot Shells ..... dis 15&2 %
Brass Shot Shells, 1st quality ..... dis 60&2 %
Brass Shot Shells, Club, Rival and Climax ..... dis 65&2 %

Shells Loaded—
List No. 19, 1887 ..... dis 20 & 10 %

Wads—
U. M. C. & W. R. A.—B. E., 11 up .. $2.00 }
U. M. C. & W. R. A.—B. E., 9&10 .. 2.30 }
U. M. C. & W. R. A.—B. E., 7&8 .... 2.60 } D e 20&2 ¢ With small extras.
U. M. C. & W. R. A.—P. E., 11 up. 3.10 }
U. M. C. & W. R. A.—P. E., 9&10.. 4.00 }
U. M. C. & W. R. A.—P. E., 7&8 .. 4.90 }
Eley's B. E., 11 up $1.75
Eley's P. E. 11 @ 20 ..... $2.80

Anvils.—Eagle Anvils .... ₩ ℔ 10¢, dis 20 @ 20&5 %
Peter Wright's ..... 9½¢
Armitage's Mouse Hole ..... 8½¢
Armitage Mouse Hole, Extra ..... 11½@11½¢
Trenton ..... 9½@9½¢
Wilkinson's ..... 9½@10¢
J. & Riley Carr Patent Solid ..... 11@11½¢

Anvil Vise and Drill—
Millers Falls Co. ..... $18.00, dis 20 %
Cheney Anvil and Vise ..... dis 25 %
Allen Combined Anvil and Vise ..... $3, dis 40&10 %
Moore & Barnes Mfg. Co. ..... dis 33⅓ %

Augers and Bits.

Douglass Mfg. Co. }
New Haven Copper Co. }
Wm. A. Ives & Co. } ..... dis 70 %
Humphreysville Mfg. Co. }
French, Swift & Co. (F. H. Beecher) }
Cook's, Douglass Mfg. Co. ..... dis 55 %
Cook's, New Haven Copper Co. ..... dis 50&10@50&10&5 %
Ives' Circular Lip ..... dis 60 %
Patent Solid Head ..... dis 30 %
C. E. Jennings & Co., No. 10, extension l'p ..... dis 40 %
C. E. Jennings & Co., No. 30 ..... dis 60 %
C. E. Jennings & Co., Auger Bits, in fancy boxes, ₩ set, 32½ quarters, No. 5, $5; No. 3C, $2 ..... dis 20 %
Lewis' Patent Single Twist ..... dis 45 %
Russell Jennings' Augers and Bits ..... dis 25 %
Imitation Jennings Bits, new list ..... dis 60@60&10 %
Pugh's Black ..... dis 20 %
Car Bits ..... dis 50&10&60 %
L'Hommedieu Car Bits ..... dis 15&10 %
Forstner Pat. Auger Bits ..... dis 10 %

Hollow Augers—
Ives } dis 25&10 @ 25&10&5 %
French, Swift & Co. }
Douglass'
Bonney's Adjustable ₩ doz. $48 ..... dis 40&10 %
Steams'. ..... dis 20&10 %
Ives' Expansive, each $4.50 ..... dis 50&10 %
Universal Expansive, each $4.50 ..... dis 20 %
Wood's ..... dis 25 @ 25&10 %

Expansive Bits—
Clark's small, $18; large, $26 ..... dis 35 @ 35&5 %
Ives' No. 4, per doz., $60 ..... dis 35 @ 40 %
Swan's ..... dis 40 %
Steer's, No. 1, $26; No. 2, $22 ..... dis 35 %
Stearns' No. 2, $48 ..... dis 20 %

Gimlet Bits—
Common ..... ₩ gross $2.75 @ $3.25
Diamond ..... ₩ doz. $1.10, dis 25&10 %
"Bee" ..... dis 25 @ 25&5 %
Double Cut, Shepardson's ..... dis 45 @ 45&5 %
Double Cut, Ct. Valley Mfg. Co. ..... dis 30&10 %
Double Cut, Hartwell's, ₩ gro. $5.25
Double Cut, Douglass' ..... dis 40&10 %
Double Cut, Ives' ..... dis 60 @ 60&5 %

Bit Stock Drills—
Morse Twist Drills ..... dis 60&10&5 %
Standard ..... dis 50&10&5 %
Cleveland ..... dis 50&10&5 %
Syracuse, for metal ..... dis 50&10&5 %
Syracuse, for wood (wood list) ..... dis 30 @ 30&5 %
Williams' or Holt's, for metal ..... dis 50&10&10 %
Williams' or Holt's, for wood ..... dis 40&10 %

Ship Augers and Bits—
L'Hommedieu's ..... dis 15&10 % } Extras often given.
Watrous's ..... dis 15&10 %
Snell's ..... dis 15&10 %
Snell's Ship Auger Patt'n Car Bits, dis 15&10 %

Awl Hafts.

Sewing, Brass Ferrule ..... $3.50 ₩ gross—dis 45&10 %
Patent Sewing, Short ..... $1.00 ₩ doz—dis 40&10 %
Patent Sewing, Long ..... $1.20 ₩ doz.—net
Patent Peg, Plain Top ..... $10.00 ₩ gross—dis 45&10 %
Patent Peg, Leather Top ..... $12.00 ₩ gross—dis 45&10 %

Awls, Brad Sets, &c.

Awls, Sewing, Common ..... ₩ gross $1.70—dis 35 %
Awls, Shouldered Peg .... ₩ gross $2.45—dis 40@40&10 %
Awls, Patent Peg ..... ₩ gross 63¢—dis 40@40&10 %
Awls, Shouldered Brad ..... $2.70 ₩ gross—dis 35 %
Awls, Handled Brad ..... $7.50 ₩ gross—dis 45 %
Awls, Handled Scratch ..... $7.50 ₩ gross—dis 35&10 %
Awls, Socket Scratch ..... $1.50 ₩ doz—dis 25 @ 30 %

Awl and Tool Sets.

Ives's Sets, Awls & Tools, No. 20, ₩ doz. $10—dis 50&10 %
Gray's Ad Tool Hdls., Nos. 1, $12; 2, $18.; 3, $12; 4, $9. dis 25&25&10 %
Miller's Falls Adj. Tool Hdls., Nos. 1, $12, 2, $18, dis 25 %
Henry's Combination Haft ..... ₩ doz. $6
Brad Sets, No. 42, $10.50 No. 43, $12.50 ... dis 70&10&5 %
Brad Sets, Stanley's Excelsior, No. 1, $7.50. }
Brad Sets, Stanley's Excelsior, No. 2 $4.00. } dis 30&10 %
Brad Sets, Stanley's Excelsior, No. 3, $5.50 }

Axes.

Makers' and Special Brands—
First quality ..... ₩ doz. $6.00 @ $6.50
Others ..... ₩ doz. $5.50 @ $5.75

Axle Grease.

Fraser's, in bulk ..... Keg ₩ ℔, 4¢; Pail, ₩ ℔, 5¢ net
Fraser's, in boxes ..... ₩ gross $9.50
Dixon's Everlasting, in bxs., ₩ doz., 1 ℔ $1.20; 2 ℔, $2
Dixon's Everlasting ..... 10-℔ pails, each, 85¢
Lower grades, special brands ..... ₩ gro $5.50 @ $7

Axles.—No. 1, 4¢ @ 4¼¢ No. 2, 5¼ @ 5½¢,

Nos. 7 to 18 ..... dis 50@55 %
Nos. 19 to 22 ..... dis 60&10&10@70 %
National Wrought Steel Tubular Self-Oiling Standard Farm (1 to 5) and Special Farm (A1 to A5
Less than 10 sets ..... dis 33⅓ %
Over 10 sets ..... dis 33⅓&5 %
(Strong Exp. (6 to 9), & XX Strong Truck (10 to 16):
Less than 10 sets ..... dis 10 %
Over 10 sets ..... dis 10&5 %

Bag Holders.

Screengle's Pat., ₩ doz $18. ..... dis 60 %

Balances.—Spring Balances. ..... dis 50 %

Common 24 ℔ ..... ₩ doz., $1.50—dis 50 %
Chatillon's Spring Balances ..... dis 50 %
Chatillon's Circular Spring Balances ..... dis 60 %

Belts.

Hand—
Light Brass ..... dis 70&10 %
Extra Heavy ..... dis 60&10 %
White Metal ..... dis 60&10&10 %
Silver Chime ..... dis 25&10&5 %
Globe (Cone's Patent) ..... dis 25&10 @ 35 %

Door—
Long, Abbe's ..... dis 25&10 @ 35 %
Long, Yankee ..... dis 40&10 %
Long, Barton's ..... dis 40&10 @ 50 %
Frank, Taylor's ..... dis 25&10 %
Frank, Brooks' ..... dis 50&10&2 %
Frank, Cone's ..... dis 10 %
Frank Connel's ..... dis 20&10 %
Lever, Sargent's ..... dis 60&10 %
Lever, Taylor's Bronzed or Plated ..... net
Lever, Taylor's Japanned ..... dis 25&10 %
Lever, R. E. ₩ Co's ..... dis 50&10&2 %
Pull, Brook's ..... dis 50&10&2 %
Pull, Western ..... dis 25&10 %

Cone—
Common Wrought ..... dis 60&10 %
Western ..... dis 20&10 %
Western, Sargent's list ..... dis 70&10 %
Kentucky "Star" ..... dis 20&10 %
Kentucky, Sargent's list ..... dis 70&10 %
Dodge, Genuine Kentucky, new list, dis 70@70&10 %
Texas Star ..... dis 50&10 @ 50&10&5 %
Tall ..... dis 40@40&5 %
Farm Bells ..... ₩ ℔, 3¢ @ 3½¢
Steel Alloy Church and School Bells ..... dis 40 %

Bellows.—Blacksmiths' ..... dis 60&10&5 @ 60 %

Molders' ..... dis 40 @ 40&10 %
Hand Bellows ..... dis 4 @ 10 @ 10 %

Belting, Rubber.

Common Standard ..... dis 70&10 %
Standard ..... dis 70&70&10 %
Extra ..... dis 60&10 %
N. Y. B. & P. Co., Standard ..... dis 60&5 %
N. Y. B. & P. Co., Extra Standard ..... dis 50&10 %

Bench Stops.

Morrill's ..... ₩ doz $9—dis 50 %
Hotchkiss's ..... ₩ doz $5.00—dis 10 @ 10&10 %
Weston's, per doz No. 1, $10; No. 2, $9 ... dis 25&10&5 %
McGill's ..... ₩ doz $3—dis 10 %

Bits.—Auger, Gimlet Bit Stock, Drills, &c., see Augers and Bits.

Bit Holders.

Extension, Barber's ... ₩ doz $15.00—dis 40 @ 40&10 %
Extension, Ives' .... ₩ doz $20.00—dis 60&5 @ 60&10 %
Diagonal ..... ₩ doz $24.00—dis 40 %
Angular ..... ₩ doz $24.00—dis 40&5 %

Blind Adjusters.

Domestic ..... ₩ per doz $3.00—dis 33⅓ %
Excelsior ..... ₩ doz $10.00—dis 50&10&2 %
Washburn's Self-Locking ..... dis 20 @ 20&10 %

Blind Fasteners.

Mackrell's ..... ₩ doz pairs, $1.00—dis 20@20&10 %
Van Sand's Screw Pattern ..... $15 ₩ gro.—dis 60&10 %
Van Sand's Old Pattern ..... $15 ₩ gro.—dis 55&10 %
Washburn's Old Pattern ..... $9 ₩ gro. net
Merriman's ..... new list, net
Austin & Eddy No. 2008 ..... $9 ₩ gro. net
Security Gravity ..... $9 ₩ gro. net

Blind Staples.

Barbed, ½ in. and larger ..... ₩ ℔ 8 @ 8½¢ net
Barbed, ⅝ in ..... ₩ ℔ 9 @ 9½¢ net

Blocks.

Ordinary Tackle, list April 17, '85 ..... dis 40 %
Cleveland Block Co., Mal. Iron ..... dis 50 %
Novelty Tackle Blocks, Mal. Iron ..... dis 50 %

Bolts.

Door and Shutter—
Cast Iron Barrel, Square, &c. ..... dis 70 @ 70&10 %
Cast Iron Shutter Bolts ..... dis 70 @ 70&10 %
Cast Iron Chain (Sargent's list) ..... dis 65&10 %
Ives' Patent Door Bolts ..... dis 60 %
Wrought Barrel ..... dis 70 @ 70&10 %
Wrought Square ..... dis 70 @ 70&10 %
Wr't Shutter, all iron, Stanley's list ..... dis 60&10 %
Wr't Shutter, Brass Knob, Stanley's ..... dis 40&10 %
Wrought Shutter, Sargent's list ..... dis 60&10 %
Wrought Sunk Flush, Sargent's list ..... dis 55&10 %
Wrought Sunk Flush, Stanley's list ..... dis 50&10 %
Wrought S. K. Flush, Com'n Stanley's list, dis 65&10 %

Carriage—
Com. list June 10, '84 ..... dis 75&5&2 %
Genuine Eagle, list Oct., '84 ..... dis 75&10 %
Phila. pattern, list Oct. 7, 84 ... dis 75&10@75&10&5 %
R. S. & W. old list ..... dis 70 %

Tire—
Common, list Feb. 28, 1883 ..... dis 70 %
P. C. B. & N. Co., Empire, list Feb. 28, 1883 ... dis 70 %
P. C. B. & N. Co., Philadel., list Oct. '84 ... dis 82½ %
P. C. B. & N. Co., Keystone, Phil. list Oct. '84 ... dis 80 %
P. C. B. & N. Co., Norway, Phil. list, Oct. '84. dis 75&10 %
Am. S. Co., Norway, Phil., list Oct. 16, '84 .. dis 75&10 %
Am. S. Co., Eagle, Phil., list Oct. 16, '84 ... dis 80 %
Am. S. Co., Philadel. list, Oct. 16, '84 ..... dis 82½ %
Am. S. Co., Bay State, list Feb. 28, '83 ..... dis 70 %
R. S. & W., Philadel., list Oct. 16, 1884 ..... dis 82 %
R. & E. Mfg. Co. ..... dis 70 %

Stove and Plow—
Stove ..... dis 62½ %
Plow ..... dis 60&5 %
Am. S. Co. Stove, Annealed ..... dis 62½ %
R. S. & W., Plow ..... dis 55 %
R. S. & W., Stove ..... dis 62½ %
R. & E. Mfg. Co., Stove ..... dis 62½ %
Machine ..... dis 75 & 10 @ 75&10&5 %
Bolt Ends ..... dis 75&10 @ 75&10&5 %

Borax ..... ₩ ℔ 9½@10½¢

Boring Machines.

Without Augers.	Upright	Angular.
Douglas	$5.50	$6.75 ..... dis 50 %
Snell's, Rice's Patent	5.50	6.75, dis 40&10&10 %
Jennings	5.50	6.75, dis 45@45&10%
Other Machines	3.35	2.75 ..... net
Phillips' Pat., with Augers	7.00	7.50 ..... net

Bow Pins

Humason, Beckley & Co.'s ..... dis 60&10 %
Sargent & Co.'s ..... $17 and $18, dis 60&10 %
Peck, Stow & W. Co. ..... dis 50&10 @ 50&10&5 %

Braces.

Backus, Nos. 110 to 114 and 31 to 33 .. dis 60&5@60&10%
Backus, Nos. 6, 8, 12, 14 ..... dis 60&10&5 %
Backus, Nos. 16, 18, 20, 29, 7, 9, 11 ..... dis 70&10&5 %
Barber's, Nos. 10 to 16 ..... dis 50 %
Barber's, Nos. 30 to 33 ..... dis 50&10 %
Barber's, Nos. 40 to 63 ..... dis 50&10 %
Parker's, Nos. 8, 10 and 12 ..... dis 75&10@80 %
Parker's, Plated, Nos. 8, 10 and 12, ... dis 65&10&70 %
Osgood's Ratchet ..... dis 40&10@50 %
Spofford's ..... dis 50&10 %
Ives' New Haven Novelty ..... dis 70 @ 70&5 %
Ives' New Haven Ratchet ..... dis 60&5 @ 60&10 %
Ives' Barber Ratchet ..... dis 60&5 @ 60&10 %
Ives' Barbers ..... dis 60&5 @ 60&10 %
Ives' Spofford ..... dis 60&5 @ 60&10 %
Common Ball, American ..... $1.10 @ $1.15
Bartholomew's, Nos. 25, 27, 30 ..... dis 50&10@60&5 %
Bartholomew's, Nos. 117 118 119 ..... dis 70 @ 70&5 %
Amidon's Barker's Imp'd Pla'n ..... dis 75&10 @ 80 %
Amidon's Barker's Imp. Nickeled ..... dis 65&10 @ 70 %
Amidon's Ratchet ..... dis 75&10 @ 80 %
Amidon's Eclipse Ratchet ..... dis 60 %
Amidon's Globe Jawed ..... dis 40&40&10 %
Amidon's Corner Brace ..... dis 40 @ 40&10 %
Amidon's Universal ..... 8 in., $2.10; 10 in., $2.25
Amidon's Buffalo Ball ..... $1.10 @ $1.15
P. S. & W. ..... dis 50&10 %

Brackets.

Shelf, plain, Sargent's list ..... dis 55&10 @ 55&10&10 %
Shelf, fancy, Sargent's list ..... dis 60&10 @ 60&10&10 %
Reaning, plain ..... dis 60&10 @ 60&10&5 %
Reading, Rosette ..... dis 60&10 @ 60&10&10 %

Bright Wire Goods. ..... dis 85 @ 85&10

Broilers.	Inch.	9	10	9 x 11
Henis' Self-Basting	Per doz.	$4.50	5.50	6.50

Buckets.—See Well Buckets and Pails.

Bull Rings.—Union Co. Nut, ... dis 55 %
Sargent's ..... dis 66⅔&10 @ 70&5 %
Hotchkiss' low list ..... dis 30 %
Humason, Beckley & Co.'s ..... dis 70 %
Peck, Stow & W. Co.'s ..... dis 50&10 @ 50&10&10 %
Ehrich Hdw. Co., White Metal, low list. dis 50@50&10 %

Butcher's Cleavers.

Bradley's ..... dis 25 @ 30
L. & I. J. White ..... dis 20&5 %
Beatty's ..... dis 40 @ 40&5%

1	2	3	4	5	6	7	8
$16.50	19.00	21.50	24.00	27.00	30.00	33.50	36.50

New Haven Edge Tool Co.'s ..... dis 40
P. S. & W. ..... dis 33⅓&5@33⅓&10

Butts.

Brass—
Wrought Brass ..... dis 70@70&10 %
Cast Brass, Tiebout's ..... dis 33⅓ %
Cast Brass, Corbin's Pat. ..... dis 33⅓&10 %
Cast Brass, Loose Joint ..... dis 33⅓&10 %

Cast Iron—
Fast Joint, Narrow ..... dis 50&10
Fast Joint, Broad ..... dis 55&10
Loose Joint }
Loose Joint, Japanned }
Loose Joint, Jap. with Acorns }
Parliament Butts ... } ..... dis 70&10
Mayer's Hinges }
Loose Pin, Acorns }
Loose Pin, Acorns, Japanned }
Loose Pin, Acorns, Jap, Fitd. Tips }

Wrought Steel—
Fast Joint Narrow ..... dis 70&10 %
Fast Joint, Lt. Narrow ..... dis 70&10 %
Fast Joint, Broad ..... dis 70&10 %
Loose Joint, Broad ..... dis 70&10 %
Table Butts, Back Flaps, &c. ..... dis 70&10 %
Inside Blind, Regular ..... dis 70&10 %
Inside Blind, Light ..... dis 70&10 %
Loose Pin ..... dis 70&10 %
Bronzed Wrought Butts ..... dis 40&10@40&10&5 %

Calipers.—See Compasses.

Calks, Toe

Gaulter ..... ₩ ℔ 5½@6¢
Dewicks ..... ₩ ℔ 5½@6¢

Can Openers.

Messenger's Comet ..... ₩ doz $3.00, dis 25 %
American ..... ₩ gross $3.00
Duplex ..... ₩ doz 25¢, dis 15 @ 20 %
Lyman's ..... ₩ doz $3.75, dis 20 %
No. 4, French ..... ₩ doz $2 25, dis 55 @ 60 %
No. 5, Iron handle ..... ₩ gross $6.00, dis 45 @ 50 %
Eureka ..... ₩ doz $2.50, dis 10 %
Sardine Scissors ..... ₩ doz $2.75@$3 00 %
Star ..... ₩ doz $2.75 %
Sprague, No. 1, $2 2 3 $2.50 ..... dis 50&10&10 %

World's Best, ₩ gross, No. 1, $12.00; No. 2, $24.00; No. 3, $36.00.....dis 50&10 %
Universal.....₩ doz $3.00, dis 35&5 %
Domestic.....₩ doz $2.50, dis 45 %
Champion.....₩ doz $2.00, dis 50 %

Cards.
Horse and Curry.....dis 10&10 @ 10&10&10 %
Cotton.....New list, Aug., 1883, dis 10 @ 10&10 %
Wool " " " dis 10 @ 10&10 %

Carpet Stretchers.
Cast Steel, Polished.....₩ doz $2.25
Cast Iron, Steel Points.....₩ doz 80¢
Socket.....₩ doz $1.75
Bullard's.....dis 25 @ 25&10 %

Carpet Sweepers.
Bissell No. 5.....₩ doz $17.00
Bissell No. 7 New Drop Pan.....₩ doz $19.00
Bissell Grand.....₩ doz $36.00
Grand Rapids.....₩ doz $24.00
Crown Jewel.....No. 1, $18; No. 2, $19; No. 3, $20
Magic.....₩ doz $15.00
Jewel.....₩ doz $17.00
Mystic.....₩ doz $16.00
Cottage.....₩ doz $15.00
Garland.....₩ doz $18.00
Parlor Queen.....₩ doz $24.00
Housewife's Delight.....₩ doz $15.00
Queen.....₩ doz $16.00
Queen, with band.....₩ doz $18.00
King.....₩ doz $20.00
Weed Improved.....₩ doz $18.00
Hub.....₩ doz $16.00
Cog Wheel.....₩ doz $16.00

Cartridges.—See Ammunition.

Casters.
Bed.....} New list:
Plate.....} Brass...dis 55 @ 55&5 %
Shallow Socket.....} Others..dis 60 @ 60&5 %
Deep Socket.....40&10 %
Yale Casters, list May, 1884.....dis 30&10&40 %
Yale, Gem.....dis 60@60&5 %
Martin's Patent (Phœnix).....dis 45&10 @ 50 %
Payson's Anti-friction.....dis 60 @ 60&10 %
"Giant" Truck Casters.....dis 10 @ 10&5 %
Stationary Truck Casters.....dis 45&10

Cattle Leaders.
Humason, Beckley & Co.'s.....dis 70 %
Sargent's.....dis 60&4&10 %
Hotchkiss.....dis 30 %
Peck Stow & W. Co.....dis 50&10 %

Chain.
Trace, 6¼-10-2, exact sizes, ₩ pair, $1 02 } dis 50&10&5
Trace, 6¼-10-3, exact sizes, ₩ pair, .92 } @ 60%
Trace .7-10-2, exact sizes...₩ pair, 1.11 }
NOTE.—Traces, "Regular" sizes 3¢ net ₩ pair less than exact.
Log, Fifth, Stretcher, and other fancy Chains, list Nov. 1, 1884.....dis 50&10 @ 50&10&5 %
American Coil 3-16 ¼ 5-16 ⅜ 7-16 ½ ⅝ ¾
In cask lots, 8.75 6.25 5.00 4.50 4.40 4.00 3.75 3.50
Less than cask lots, add ½¢@1½¢ ₩ ℔.
German Coil, list of June 20, 1887...dis 50&10&5&60 %
Ger. Halter Chain, list of June 20, 1887.....dis 50&10&5&60 %
Covert Halter, Hitching and Breast.....dis 50&2 %
Covert Traces.....dis 35&2 %
Oneida Halter Chain.....dis 60 @ 60&5 %
Galvanized Pump Chain.....₩ ℔ 5½¢ @ 6¢
Jack Chain, iron.....dis 70&10 @ 75 %
Jack Chain, Brass.....dis 65 @ 70 %

Chalk.
White.....₩ gro 50¢
Red.....₩ gro 70¢
Blue.....₩ gro 87½¢
White Crayons.....₩ gro 12¢ @ 12¾ dis 10¢

Chalk Lines.—See Lines.

Chisels.
Socket Framing and Firmer—
P., S. & W.....} dis 75&5 @
New Haven and Middlesex.....} 75&10 %
Mix.....}
Buck Bros.....dis 30 %
Merrill.....dis 60&10&60&10&5 %
L. & I. J. White.....dis 30 @ 30&5 %
Witherby and Douglass.....dis 75 @ 75&5 %
Tanged Firmers.....dis 40&10 %
Tanged Firmers, Butcher's.....$4.75 @ $5.00
Tanged Firmers, Spear & Jackson's.....$5.00 to $
Tanged Firmers, Buck Bros.....dis 30 %
Cold Chisels, ₩ ℔.....16¢ @ 19¢

Chucks.
Beach Patent.....each, $5.00, dis 20 %
Morse's Adjustable.....each, $7.00, dis 20 @ 20&5 %
Danbury.....each, $5.00, dis 30 @ 30&5 %
Syracuse, Bals Pat.....dis 25 %

Clamps.
Providence Tool Co.'s Wrought Iron.....dis 25 %
Adjustable, Gray's.....dis 20 %
Adjustable, Lambert's.....dis 20 %
Adjustable, Snow's.....dis 40&5 %
Adjustable, Hammer's.....dis 15 %
Adjustable, Stearns'.....dis 20&10 %
Stearns' Adjustable Cabinet and Corner...dis 20&10 %
Cabinet, Sargent's.....dis 60&4&10 %
Carriage Makers', Sargent's.....dis 60&4&10 %
Eberhard Mfg. Co.....dis 40&5 @ 40&10 %
Warner's.....dis 40&10 @ 40&10&5 %
Saw Clamps.....See Vises

Clips.
Norway, Axle, ¼ & 5-16.....dis 55&5&5
Second grade Norway Axle, ¼ & 5-16.....dis 65&5
Superior Axle Clips.....dis 60&5&5 @ 60&5&5&5 %
Norway Spring Bar Clips, 5-16.....dis 60&5&5
Wrought-Iron Felloe Clips.....₩ ℔ 5½¢
Steel Felloe Clips.....₩ ℔ 5¢
Baker Axle Clips.....dis 25 %

Cockeyes......dis 50 %

Cocks, Brass.
Hardware list.....dis 40&10&2 %

Coffee Mills.
Box and Side, List revised Jan. , 1888.....dis 50&2 %
American, Enterprise Mfg Co.....dis 20&10&30 %
The "Swift," Lane Bros.....dis 20&10 %

Compasses, Dividers, &c.
Compasses, Calipers, Dividers.....dis 70@70&10 %
Bemis & Call Co.'s Dividers.....dis 60&5 %
Bemis & Call Co.'s Compasses & Calipers...dis 50&5 %
Bemis & Call Co.'s Wing & Inside or Outside.dis 50&5 %
Bemis & Call Co.'s Double.....dis 60 %
Bemis & Call Co.'s (Call's Patent Inside).....dis 30 %
Excelsior.....dis 50 %
J. Stevens & Co.'s Calipers and Dividers....dis 25&10 %

Coopers' Tools.
Bradley's.....dis 20 %
Barton's.....dis 20@20&5 %
L. & I. J. White.....dis 20&5 %
Albertson Mfg. Co.....dis 25 %
Beatty's.....dis 40 @ 40&5 %
Sandusky Tool Co.....dis 30 @ 30&5 %

Corkscrews.
Humason & Beckley Mfg. Co. .....dis 40 @ 40&10 %
Clough's Patent.....dis 33⅓ @ 33⅓&5 %
Howe Bros. & Hulbert.....dis 35 %

Corn Knives and Cutters.
Bradley's.....dis 10 %
Wadsworth's.....dis 25 %

Cradles.—Grain.....dis 50&10 %

Crow Bars.
Cast Steel.....₩ ℔ 4¢
Iron, Steel Points.....₩ ℔ 3½¢

Curry Combs.
Fitch's.....dis 50&10 @ 50&10&10 %
Rubber.....₩ doz $10.00, dis 20 %
Perfect.....dis %

Curtain Pins.
Silvered Glass.....net
White Enamel.....net

Cutlery.
Beaver Falls and Booth's.....dis 33⅓ %
Wostenholme.....$7.75 to $

Dampers, &c.
Dampers, Buffalo.....dis 50 %
Buffalo Damper Clips.....dis 50 %
Crown Damper.....dis 40 %
Excelsior.....dis 40&10 %

Dividers—See Compasses.

Dog Collars.
Embossed Gilt, Pope & Stevens' list.....dis 30&10 %
Leather, Pope & Stevens' list.....dis 40 %
Brass, Pope & Stevens' list.....dis 40 %

Door Springs.
Torrey's Rod, regular size.....₩ doz $1.30
Gray's.....₩ gro, $20.00, dis 20 %
Bee Rod.....₩ gro, $20.00, dis 20 %
Warner's No. 1, ₩ doz, $2.50; No. 2, $3.30, dis 40&10&50 %
Gem (Coil), list April 19, 1886.....dis 10 %
Star (Coil), list April 19, 1886.....dis 20 %
Victor (Coil).....dis 60 @ 60&10 %
Champion (Coil).....dis 60&10 @ 60&10&10 %
Philadelphia.....5 in., $5.00; 8 in., $7.75, dis 30 %
Cowell's.....No. 1, ₩ doz $18.00; No. 2, $15.00, dis 50 %
Rubber, complete.....₩ doz $4.50, dis 55&10 %
Hercules.....dis 50 %
Shaw Door Check and Spring.....dis 25 @ 30 @ 35 %
Elliott's Door Check and Spring.....dis 25 %

Drawing Knives.
P., S. & W.....} dis 75&5 @
Mix.....} 75&10 %
New Haven and Middlesex.....}
Merrill.....dis 60&10&10 %
Witherby and Douglass.....dis 75@75&5 %
Watrous.....dis 15&10 @ 25 %
L. & I. J. White.....dis 20&5 %
Bradley's.....dis 35 %
Adjustable Handle.....dis 25 @ 33⅓&5 %
Wilkinson's Folding.....dis 25 @ 25&5 %

Drills and Drill Stocks.
Blacksmiths'.....each, $1.75
Blacksmiths' Self-Feeding.....each, $7.50, dis 20 %
Breast, P. S. & W.....dis 40&10 %
Breast, Wilson's.....dis 30&5 %
Breast, Millers Falls.....each, $3.00 dis 25 %
Breast, Bartholomew's... each, $2.50, dis 25&10 @ 40 %
Ratchet, Merrill's.....dis 20 @ 20 & 5 %
Ratchet, Ingersoll's.....dis 25 %
Ratchet, Parker's.....dis 20 @ 20&5 %
Ratchet, Whitney's.....dis 20&10 %
Ratchet, Weston's.....dis 20@25 %
Ratchet, Moore's Triple Action.....dis 25 @ 30 %
Whitney's Hand Drill, Plain, $11.00, Adjustable, $12.00.....dis 20&10 %
Wilson's Drill Stocks.....dis 1[illegible]
Automatic Boring Tools.....each, $1.75 @ $1.85
Twist Drills—
Morse.....dis 50&10&5 %
Standard.....dis 50&10&5 %
Syracuse.....dis 50&10&5 %
Cleveland.....dis 50&10&5 %
Williams.....dis 50&10&10 %

Drill Bits.—See Augers and Bits.

Drill Chucks.—See Chucks.

Dripping Pans.
Small sizes.....₩ ℔ 6¾ ¢
Large sizes.....₩ ℔ 6¼ ¢

Egg Beaters.
Dover.....₩ doz., $2.00
National.....₩ doz $4.50, dis 33⅓ %
Family (T. & S. Mfg. Co.).....₩ gro, $17.00@$18.00
Kingston (Standard Co.).....₩ gro, $6.50
Acme (Standard Co.).....₩ gro. $6.00
Duplex (Standard Co.).....₩ gro, $15.00
Duplex, extra heavy.....₩ doz extra $5.00
Rival (Standard Co.).....₩ gro. $4.2.00
Triumph (T. & S. Mfg. Co.).....₩ gro, f 10.50@$11.50
Advance No. 1.....₩ gro $10.50
Advance, No. 2.....₩ gro $10.00
Bryant's.....₩ gro $15 00
Ayres' Spiral.....₩ gro $5
Double (Hamblin & Russell Mfg Co.).....₩ gro, $16 20
Easy (Hamblin & Russell Mfg. Co.).....₩ gro, $14.00
Triple (Hamblin & Russell Mfg. Co.).....₩ gro, $16.20
Spiral (Hamblin & Russell Mfg. Co.).....₩ gro, $4.50
Paine, Dieni & Co's.....₩ gro $24.00

Egg Poachers.
Buffalo Steam Egg Poachers, ₩ doz., No. 1, $6.00; No. 2, $9.00.....dis 25 %

Electric Bell Sets.—Wollensak's.....dis 15 %
Bigelow & Dowse.....dis 20 %

Emery.	No. 4 to 46 gr.	No. 54 to 150 gr.	Flour, CF FF.
Kegs, ₩ ℔	4 ¢	5 ¢	2½¢
½ kegs, ₩ ℔	4¼¢	5¼¢	2¾¢
¼ kegs, ₩ ℔	4½¢	5½¢	3 ¢
10-℔ cans, 10 in case	6 ¢	6¾¢	5 ¢
10-℔ cans, less than 10	10 ¢	10 ¢	7½¢

Enameled and Tinned Ware.—See Hollow-Ware.

Escutcheon Pins.
Iron, list Nov. 11, 1885.....dis 50&10 @ 50&10&5
Brass.....dis 60 @ 60&5 %

Escutcheons.
Door Lock.....Same discounts as Door Locks
Brass Thread.....dis 60 @ 60&10 %
Wood.....dis 25 %

Faucets.
Fenn's.....dis 40 %
Bohren's Patent Rubber Ball.....dis 25 %
Fenn's Cork Stops.....dis 33⅓ %
Star.....dis 60 @ 60&5 %
Fraryer Patent Petroleum.....dis 40&10&2 %
West's Patent Key.....dis 50&10 %
Anchor Lock.....dis 45 %
Metallic Key, Leather Lined...dis 60&10 @ 60&10&10 %
Cork Lined.....dis 70&5 @ 70&10 %
Burnside's Red Cedar.....dis 50 %
Burnside's Red Cedar, bbl. lots.....dis 50&10 %
J. Sommer's Best Block Tin Key.....dis 40 %
J. Sommer's Cork Lined, 1st quality.....dis 50 %
J. Sommer's Diamond Lock.....dis 40 %
J. Sommer's Perfection, Fla. Red Cedar.....dis 50 %
J. Sommer's Goodenough Cedar.....dis 60 %
Self-Measuring, Enterprise...₩ doz $36.00—dis 20&10 %
Self-Measuring, Lane's.....₩ doz $36.00—dis 25&10 %
Self-Measuring, Victor.....₩ doz $36.00—dis 25&10 %

Felloe Plates......₩ ℔ 6 @ 6½¢

Fifth Wheels.—Derby and Cincinnati .dis 45&5 %

Files.
Domestic—
Nicholson Files, Rasps, &c .....dis 60&5 @ 60&10 %
Nicholson (X. F.) Files.....dis 25 %
Nicholson's Royal Files (Seconds)dis 75 (extra prices on certain sizes.)
Other makers, best brands.....dis 60&5 @ 60&10&5 %
Fair brands.....dis 60&10&10 @ 70 %
Second quality.....dis 70&5 @ 75 %
Heller's Horse Rasps.....dis 50&7½ @ 50&10 %
McCaffrey's Horse Rasps.....dis 50&10 %
Imported—
J. & Riley Carr.....List, April 1, 1883, dis 15 %
J. & Riley Carr Horse Rasps.....dis 10 %
Moss & Gamble.....List April 1, 1883, dis 15 %
Butcher.....Butcher's list, dis 20 %
Stubs.....Stubs list, dis 25 @ 30 %
Turton's.....Turton's list dis. 20 @ 25 %
Greaves' Horse Rasps .....American list .dis 60 %

Flaxing Machines.
Knox, 4¼-inch Rolls.....$3.25 each } dis 35 %
Knox, 6-inch Rolls.....$3.60 each }
Eagle 3¼-inch Roll.....$2.15, dis 35 %
Eagle, 5¼-inch Roll.....2.85, dis 35 %
Crown, 4½ in., $3.50; 6-in, $4.00; 8-in., $6.50 each, dis 35 %
Crown Jewel.....6-in., $3.50 each, dis 35 %
American, 5-in., $3; 6-in., $3.40; 7-in., $4.50 each, dis 35 %
Domestic Fluter.....$1.50 each, net
Geneva Hand Fluter, White Metal..₩ doz $12, dis 25 %
Crown Hand Fluter, Nos. 1, $15; 2, $12.50; 3, $10, dis 30 %
Shepard Hand Fluter, No. 85.....₩ doz $15.30, dis 40 %
Shepard Hand Fluter, No. 110.....₩ doz $11, dis 40 %
Shepard Hand Fluter, No. 95.....₩ doz $8, dis 40 %
Clark's Hand Fluter.....₩ doz $15.00, dis 35 %
Combined Fluter and Sad Iron...₩ doz $15.00, dis 30 %
Buffalo.....₩ doz $10.00. dis 10 %

Fluting Scissors......dis 45 %

Fly Traps.
Paragon.....₩ doz $1.50 @ 1.75

Fodder Squeezers.
Blair's.....₩ doz $2.00
Blair's, "Climax".....₩ doz $1.25

Forks.—Hay, Manure, &c., Asso. list.....dis 65&5 %
Hay, Manure, &c., Phila. list.....dis 60 @ 60&5 %
Plated, see Spoons.

Freezers, Ice Cream.
Buffalo Champion.....dis 60&10&5 %
Shepard's Lightning.....dis 65 %
White Mountain.....dis 60 %

Fruit and Jelly Presses.
Enterprise Mfg. Co.....dis 20&10 @ 30 %
Henis.....₩ doz $4.50
P. D. & Co.....₩ doz $4.50
Shepard's Queen City.....dis 40 %

Fry Pans.
High List.....dis 75&5 @ 75&10&5 %

No..	0	1	2	3	4	5	6	7	8
₩ doz.	$3.75	4.70	5.30	5.95	6.55	7.50	8.75	10.00	11.25

Low List

No	0	1	2	3	4	5	6	7	8
₩ doz..	$3.00	3.75	4.25	4.75	5.25	6 00	7.00	8.00	9.00

Fuse......₩ 1000 ft.
Common Hemp Fuse, for dry ground.....$2.70
Common Cotton Fuse, for dry ground.....2.85
Single Taped Fuse, for wet ground.....4.75
Double Taped Fuse, for very wet ground.....6.00
Triple Taped Fuse, for very wet ground.....7.25
Small Gutta Percha Fuse, for water.....7.50
Large Gutta Percha Fuse, for water.....12.00

Gauges.
Marking Mortise, &c .....dis 60&10 %
Wire, low list.....dis 10&10 ¢
Wire, Wheeler, Madden & Co.....dis 10 %
Wire, Morse's.....dis 50 @ 50&5 %
Wire, Brown & Sharpe's.....dis 10 @ 50 %

Gimlets.—Nail and Spike.....dis 50&10&5 %
"Eureka" Gimlets.....dis 40&10 %
"Diamond" Gimlets.....₩ gross $5.00
Double Cut, Shepardson's.....dis 45 @ 45&5 %
Double Cut, Ives'.....dis 60 @ 60&5 %
Double Cut, Douglass'.....dis 40&10 %
"Bee".....₩ gross $12, dis 25 @ 25&5 %

Glue.—Le Page's Liquid.....dis 25 @ 25&5 %
Upton's Liquid.....dis 35 %
W. N. Le Page's Improved Liquid Glue.dis25@25&5 %

Glue Pots.
Tinned and Enameled.....dis 40&5 @ 40&10%
Family, Howe's "Eureka".....dis 40 %
Family, L. F. & C.'s "Handy".....dis 50 %

Grindstones
Small, at factory.....₩ ton $7.50 @ 9.0

Grindstone Fixtures.
Sargent's Patent.....dis 70&10 %
Reading Hardware Co.....dis 30&10 %

Hack Saws.—See Saws.

Halters.—Covert's, Rope, ½-in. Jute.....dis 50&2 %
Covert's, Rope, ¼-in., Hemp.....dis 40&2 %
Covert's Adj. Rope Halters.....dis 40&2 %
Covert's Hemp Horse and Cattle Tie.....dis 50&2 %
Covert's Jute Horse and Cattle Ties.....dis 60&10&2 %

Hammers.
Handled Hammers.
Maydole's.....List Dec. 1, 1885, dis 25 @ 25&1 0%
Buffalo Hammer Co.....} List Jan. 15, '87
C. Hammond & Son.....} Dis. 50 @ 50&
Humason & Beckley.....} 10 %
Atha Tool Co.....}
Fayette R. Plumb.....dis 40&10 @ 50
Verree.....dis 5 %
Magnetic Tack, Nos. 1, 2, 3, $1.25, 1.50 & 1.75.dis 30&10 %
Nelson Tool Works.....dis 40&10 %
Warner & Nobles.....dis 20 @ 25 %
Peck, Stow & Wilcox.....dis 40 %
Sargent's.....dis 33⅓&10 %
Heavy Hammers and Sledges—
3 ℔ and under.....₩ ℔ 40¢ } dis 70 & 10
3 to 5 ℔.....₩ ℔ 36¢ } @ 75 %
Over 5 ℔.....₩ ℔ 30¢ }
Wilkinson's Smiths'.....10½¢ @ 11¢ ₩ ℔

Hand Cuffs and Leg Irons.
Providence Tool Co., Hand Cuffs, $15.00 ₩ doz..dis 10%
Providence Tool Co. ,Leg Irons, $25.00 ₩ doz.....dis 10%
Tower's.....dis 25 %
Daley's Improved Hand Cuffs: 2 Hands, Polished, ₩ doz, $45; Nickeled, $57; 3 Hands, Polished, ₩ doz. $72; Nickeled, $84.....dis 25 %

Handles.
Iron, Wrought or Cast.—
Door or Thumb.

Nos.....	0	1	2	3	4	
Per doz.	$0.90	1.00	1.18	1.35	1.50	...dis 60&10&10

Roggin's Latches.....₩ doz. 30¢ @ 3
Bronze Iron Drop Latches.....₩ doz. 70¢ net
Jap'd Store Door Handles—Nuts, $1.62; Plate, $1.10; no Plate, $0.88.....net
Barn Door.....₩ doz. $1.40, dis 10&10 %
Chest and Lifting.....dis 70 %
Handles, Wood—
Saw and Plane.....dis 40&10 @ 40&10&5 %
Hammer, Hatchet, Axe, Sledge, &c.....dis 35 %
Brad Awl.....₩ gross $2.00
Hickory Firmer Chisel, assorted.....₩ gross 4.50}
Hickory Firmer Chisel, large.....₩ gross 5.00 } dis 40
Apple Firmer Chisel, assorted.....₩ gross 5.00 }
Apple Firmer Chisel, large.....₩ gross 6.00 }
Socket Firmer Chisel, assorted.....₩ gross 3.00
Socket Framing Chisel, assorted.....₩ gross 5.00
J. B. Smith Co.'s Pat. File.....dis 50 %
File, assorted.....₩ gross 2.75 } dis 40 @
Auger, assorted.....₩ gross 5.00 } 40&10 %
Auger, large.....₩ gross 7.00 }
Patent Auger, Ives'.....dis 30&10 %
Patent Auger, Douglass'.....₩ set $1.25 net
Patent Auger, Swan's.....₩ set $1.00 net
Hoe, Rake, Shovel, &c.....dis 50&10 %
Cross Cut Saw Handles—
Atkins' No. 1 Loop, ₩ pair, 30¢ No. 3, 22¢; No. 2 and No. 4 Reversible, 22¢.
Boynton's Loop Saw Handles.....50¢, dis 60 %
Champion.....15¢

Hangers.
Barn Door, old patterns.....dis 60&10&10 @ 70 %
Barn Door, New England.....dis 60&10&10 @ 70 %
Samson Steel Anti-Friction.....dis 55 %
Orleans Steel.....dis 55 %
Hamilton Wrought Wood Track.....dis 55 %
U. S. Wood Track.....dis 60 %
Champion.....dis 60&10 %
Rider and Wooster, Medina Mfg. Co.'s list....dis 70 %
Climax Anti-Friction.....dis 55 %

Climax Steel Anti-Friction.... dis 50 %
Zenith for Wood Track.... dis 55 %
Reed's Steel Arm.... dis 50 %
Challenge, Barn Door.... dis 50 %
Sterling Improved (Anti-Friction).... dis 40&10 %
Victor, No. 1, $15; No. 2, $16.50; No. 3, $18.... dis 50&10 %
Cherbtree.... dis 50&10 %
Kidder's.... dis 50&10 @ 60 %
The "Boss".... dis 60 %
Best Anti-Friction.... dis 60 %
Duplex (Wood Track).... dis 60 %
Terry's Patent.... ₱ doz. pr. 4 in. $10; 5 in., $12.... dis 50&5 %
Cronk's Patent....No. 4, $12; No. 5, $14.40; No. 6, $18.... dis 50&10 & 5 @ 60 %
Wood Track Iron Clad.... ₱ ft. 10d. dis 50&15 @ 60 %
Carrier Steel Anti-Friction.... dis50 @ 50&5 %
Architect.... ₱ set $6.00, dis 20 %
Eclipse.... dis 20&10
Felix.... ₱ set $4.50, dis 20 %
Richards'.... dis30@30&10 %
Lane's Steel Anti-Friction.... dis 40&10 %
The Ball Bearing Door Hanger.... dis 20&10 @ 25&10 %
Warner's Patent.... dis 20@20&10 %
Stearns' Anti-Friction.... dis 20 @ 20&10 %
Stearns' Challenge.... dis 25&10 @ 25&10&10 %
Faultless.... dis 40 @ 40&10 %
American.... ₱ set $6; dis 20&10 %
Rider & Wooster, No. 1, 62½¢; No. 2, 75¢.... dis 40 %
Paragon, Nos. 1, 2 and 3.... dis 40&10 %
Paragon, Nos. 5, 6½, 7 and 8.... dis 20&10 %
Crescent.... dis 60@60&10 %
Nickel Cast Iron.... dis 50 %
Nickel, Malleable Iron and Steel.... dis 40 %
Scranton Anti Friction Single Strap.... dis 33⅓ %
Scranton Anti-Friction Double Strap.... dis 40 %
Universal Anti Friction.... dis 40 %
Wild West, 4 in. wheel, $15; 5 in. wheel, $21.... dis 45 %

Harness Snaps.—See Snaps.

Hatchets.—List Jan. 1, 1886.

Isaiah Blood.... dis 35 @ 40%
Hunt's Shingling Lath and Claw.... dis 40&5 %
Hunt's Broad.... dis 40 %
Buffalo Hammer Co.... dis 40&10&50 %
Hurd's.... dis 40&10 @ 50 %
Fayette R. Plumb.... dis 40&10 @ 50 %
Wm. Mann, Jr., & Co.... dis 50 @ 50&5%
Underhill Edge Tool Co.... dis 40&5 @ 40&10 %
Underhill's Haines and Bright goods.... dis 33⅓ %
C. Hammond & Son.... dis 40&10 @ 50 %
Simmons.... dis 40&10 @ 50 %
Peck's.... dis 40&10 @ 40&10&5 %
Kelly's.... dis 50@50&5 %
Sargent & Co.... dis 60 %
Ten Eyck Edge Tool Co.... dis 40&10@40&10&5 %
Collins, following list....dis 10 %

Shingling, Nos. 1 2 3....	₱ doz	$5.50	$6.00 $6.50
Claw, Nos. 1 2 3....	₱ doz	6.00	6 50 7.00
Lathing Nos. 1 2 3....	₱ doz	5.50	6.00 6.50

Hay Knives.

Lightning.... Mfrs. price ₱ doz $18 dis 25 % ; Jobber's Extras
Electric.... ₱ doz $17 ; dis 30 @
Gem.... ₱ doz $18 ; 30&5%
Wadsworth's.... dis 40&7½ @ 40&10 %
Carter's Needle.... ₱ doz $11.50 @ $12.00
Heath's.... ₱ doz $13.50 @ $14.00

Hinges.

Wrought Iron Hinges—

Strap and T.... dis 70&10&5 @ 70&10&10 %
Screw Hook and Strap.... (6 to 12 in., ₱ ₱.... 3½¢; (14 to 20 in., ₱ ₱.... 3½¢; (22 to 36 in., ₱ ₱.... 2½¢
Heavy Welded Hook.... (6 to 12 in., ₱ ₱.... 3½¢; (14 to 20 in., ₱ ₱.... 3½¢; (22 to 36 in., ₱ ₱.... 2½¢

Screw Hook and Eye....	⅜ in.... ₱ doz	$1.50) dis
	½ in.... ₱ doz	2.45) 10%
	⅝ in.... ₱ doz	3.80)

Rolled Blind Hinges, Nos 32 and 34.... dis 50&10
Rolled Blind Hinges, Nos. 232 and 234.... dis 55&10 %
Rolled Plate.... dis 70&10 %
Rolled Raised.... dis 70&10
Plate Hinges ₰ 8, 10 & 12 in., ₱ ₱.... 5
"Providence" over 12 in., ₱ ₱.... 4

Spring Hinges—

Geer's Spring and Blank Butts.... dis 40 %
Union Spring Hinge Co.'s list, March, 1886.... dis 20 %
Acme and U. S.... dis 30 %
Empire and Crown.... dis 20 %
Hero and Monarch.... dis 50 %
American, Gem, and Star, Japanned.... dis 20 %
American, Gem, and Star, Bronzed.... net
Oxford, Bronze and Brass.... net
Barker's Double Acting.... dis 20&10 %
Union Mfg. Co.... dis 25 %
Bommer's.... dis 30 %
Buckman's.... dis 10@20 %
Chicago.... dis 30 %

Gate Hinges—

Western.... ₱ doz $4.40, dis 55 %
N. E.... ₱ doz $7.00, dis 55 %
N. E. Reversible.... ₱ doz $5.20, dis 55&10 %
Clark's, Nos. 1 2 3.... dis 60&10&5 %
N. Y. State.... ₱ doz $5.00, dis 55&10 %
Automatic.... ₱ doz $12.50, dis 50 %
Common Sense.... ₱ doz pair $4.50, dis 50 %
Seymour's.... dis 45&10 %
Shepard's.... dis 60&10&5 %
Reed's Latch and Hinges.... ₱ doz sets $12, dis 50 %

Blind Hinges—

Parker.... dis 75&2 %
Palmer.... dis 50&5&10 %
Seymour.... dis 70&2 %
Nicholson.... dis 45&10 %
Huffer.... dis 50 %
Clark's, Nos. 1, 3, 5, 40 and 50.... dis 75&10&5@80 %
Clark's Mortise Gravity.... dis 50 %
Sargent's, Nos. 1, 3, 5, 11, 13.... dis 75&10@75&10&5 %
Sargent's, No. 12.... dis 75&10&10 %
Reading's Gravity.... dis 75&10 @ 75&10&5 %
Shepard's Noiseless Niagara Buffalo, Champion, Steamboat, Clark's Old Pattern and Clark's Tip Pattern.... dis 75&10&5 %
Shepard's O. S, Lull & Porter.... dis 75&10 %
Sheep, Shepard's Acme, Lull & Porter.... dis 75&5 %
Shepard's Queen City Reversible.... dis 75 %
Clark's Lull & Porter, Nos. 0, 1, 1½, 2, 2½, 3.... dis 75&10&2½ %
North's Automatic Blind Fixtures, No. 2, for Wood, $10.50; No. 3, for Brick, $13.50.... dis 25&2 %

Hoes.

Handled—

Garden, Mortar, &c.... dis 65&5 %
Planter's, Cotton, &c.... dis 65&5 %
Warren Hoe.... dis 60 %
Magic.... ₱ doz $4.70

Eye—

D. & H. Scovil.... dis 20
Lane's Crescent Scovil Pattern.... dis 45 %
Lane's Crescent Planters Pattern.... dis 45 & 5 %
Lane's Razor Blade, Scovil Pattern.... dis 30 %
Maynard, S. & O. Pat.... dis 45&5 %
Sandusky Tool Co., " " .... dis 60 %
Hubbard & Co., " " .... dis 60 %
Bare " " .... dis 60 %
Grub.... dis 60 @ 60&10 %

Hog Rings and Ringers.

Hill's Improved Ringers.... ₱ doz. $4.50
Hill's Old Style Ringers.... ₱ doz. $3.00
Hill's Tongs.... ₱ doz, $4.50
Hill's Rings.... ₱ doz boxes, $2.25 @ 2.40
Perfect Rings.... ₱ doz boxes $1.75 @ 2.00
Perfect Ringers.... ₱ doz. $2.50
Blair's Hog Ringers.... ₱ doz, $2.60 @ $2.65
Blair's Hog Rings.... ₱ doz 2nd @ 1.00
Champion Ringers.... ₱ doz $2.00
Champion Rings, Double.... ₱ doz, $2.25
Brown's Ringers.... ₱ doz, $2.00
Brown's Rings.... ₱ doz, $1.25 @ 1.50

Hoisting Apparatus

"Moore's" Hand Hoist, with Lock Brake.... dis 50 %
"Moore's" Differential Pulley Block.... dis 40 %

Holders, File and Tool.

Ralz Pat.... ₱ doz $4; dis 25 %
Nicholson File Holders.... dis 20 %

Hollow-Ware.

Iron—

Stove Hollow-Ware, Ground.... dis 60&10@60&10&5 %
Stove Hollow-Ware, Unground.... dis 70&5@70&10 %
Enameled and Tinned Hollow-Ware—
Kettles.... dis 70 @ 70&5 %
Oval Boilers, Saucepans & Glue Pots.... dis 40&5 @ 40&10 %
Gray Enameled Ware.... dis 10 @ 40&5 %
Agate and Granite Ware.... dis 25 %
Rustless Hollow-Ware.... dis 50 @ 50&5 %
Galvanized Tea-Kettles—

Inch....	6	7	8	9
Each....	55¢	60¢	65¢	75¢

Silver Plated—4 mo. or 5 % cash in 30 days.

Reed & Barton.... dis 40&5 %
Meriden Brittania Co.... dis 40&5 %
Simpson, Hall, Miller & Co.... dis 40&5 %
Rogers & Brother.... dis 40&5 %
Hartford Silver Plate Co.... dis 40&5&5 %
William Rogers Mfg. Co.... dis 40&5&5 %

Hooks.

Cast Iron—

Bird Cage, Sargent's list.... dis 60&10&10 %
Bird Cage, Reading.... dis 60&10&10 %
Clothes Line, Sargent's list.... dis 60&10&10 %
Clothes Line, Reading list.... dis 60&10 @ 60&10&10 %
Ceiling, Sargent's list.... dis55&10&10 %
Harness, Reading list.... dis 55&10 @ 55&10&10 %
Coat and Hat, Sargent's list.... dis 55&10 %
Coat and Hat, Reading.... dis 50&10 @ 50&10&10 %

Wrought Iron—

Cotton.... ₱ doz $1.25
Cotton Pat. (N. Y. Mallet & Handle W'ks).... dis 30 %
Tassel and Picture (T. & S. Mfg. Co.).... dis 50 %
Wrought Staples, Hooks, &c.... See Wrought Goods
Bench Hooks.... See Bench Stops

Wire—

Wire Coat and Hat, Gem, list April, 1886.... dis 45
Wire Coat and Hat Mates', list April, 1886.... dis 45
Indestructible Coat and Hat.... dis. 45 %
Wire Coat and Hat, Standard.... dis 45 %
Belt.... dis 75&10 @ 80
Grass.... ₱ doz $2.00
Bush.... dis 55 @ 60 %
Whiffletree—Patent.... dis 55 %
Hooks and Eyes—Malleable Iron.... dis 70 @ 70&10 %
Hooks and Eyes—Brass.... dis 60&10&10 %
Fish Hooks, American.... dis 50 %

Horse Nails.

Nos.	6	7	8	9	10	
Ausable....	28¢	26¢	25¢	24¢	23¢.	dis 25&10@25&10&10 %
Clinton, Fin.	24¢	22¢	21¢	20¢	19¢	dis 40&10 @ 50 %
Essex....	28¢	26¢	25¢	24¢	23¢.	dis25&10@25&10&10
Lyra....	25¢	23¢	22¢	21¢	20¢	dis 40&10&5@50 %
Snowden....	25¢	23¢	22¢	21¢	20¢	dis 40&10&5@50 %
Putnam....	24¢	22¢	21¢	20¢	19¢.	dis 5&10&2½&2½ %
Vulcan....	23¢	21¢	20¢	19¢	18¢.	dis 12½&5
Northwest'n.	25¢	23¢	22¢	21¢	20¢.	dis 10&10&5&5
Globe....	23¢	21¢	20¢	19¢	18¢.	dis 12½&5&5
A. G....	25¢	23¢	22¢	21¢	20¢.	dis 25&10 @ 33⅓&5 %
C. R.-K....	25¢	23¢	22¢	21¢	20¢.	dis 25&10 @ 33⅓&5 %
Champlain....	28¢	26¢	25¢	24¢	23¢	dis25&10&10 %
New Haven....	28¢	26¢	25¢	24¢	23¢	dis25&10@25&10&10 %
Saranac....	38¢	21¢	20¢	19¢	18¢.	dis 30&10 %
Champion....	25¢	23¢	22¢	21¢	20¢.	dis 10&10&10
Capewell....	28¢	26¢	25¢	24¢	23¢.	dis 35&5 @ 35&10
Star....	23¢	21¢	20¢	19¢	18¢.	dis 10&10@10&12½ %
Anchor....	23¢	21¢	20¢	19¢	18¢.	dis 35 %
Western....	23¢	21¢	20¢	19¢	18¢	dis 40&10 %
Empire Bronzed....						14 per lb.

Horse Shoes—See Shoes, Horse.

Hose, Rubber, competition...75&10 & 75&10&5 %
Standard.... dis 70&7 &10 %
Extra.... dis 60 @ 60&10 %
N. Y. S. & P. Co., Para.... dis 30&10 %
N. Y. S. & P. Co., Extra.... dis 50 %
N. Y. S. & P. Co., Dundee.... dis 60&10&5 %

Huskers.

Blair's Adjustable.... ₱ gross $8.00
Blair's Adjustable Clipper.... ₱ gross 7.00

Ice Picks, Chisels, &c.

Am. Ice Chisel Pol'd. ...₱ doz $3.00, dis 2 @20&5 %
National Ice Chisel.... ₱ doz $6.25, dis 20 %
Novelty Ice Breakers.... ₱ doz $6.25, dis 20 %
Dunlap's Ring Picks.... ₱ doz $2.00, dis 15 %
Wood Head Picks, Sargent's.... ₱ doz $1.60, dis 50&10 %
Iron Head Picks, Sargent's.... ₱ doz $1.25, dis 50&10 %
Ice Mallets, Pick in handle.... ₱ doz $2.00, dis 15 %
Ice Axes, Small Cast or Mall... ₱ doz $1.25, dis 20&10 %
Combination Ice Tools.... ₱ doz $2.00 net
Acme Ice Pick and Tongs... ₱ gross $55.00, dis 50&10 %
Roger's Lightning Ice Chisel.... ₱ gross $28.50

Ice Tongs.

Champion, S. S. & Co.... ...₱ doz $4.00, dis 25&10 %
Family.... ₱ doz $2.75, dis 20@25 %

Jack Screws.—See Screws.

Kettles.

Brass, 7 to 17 in., ₱ ₱....	Spun. 24¢	Stamped. 21 ¢
Brass larger than 17 inches, ₱ ₱..	26¢	23½¢
Enameled and Tea Kettles....	See *Hollow-Ware*	

Keys.

Lock Asso'n list Dec. 30, 1886.... dis 50&10 @ 60&5 %
Eagle, Cabinet, Trunk and Padlock.... dis 33⅓&2 %
Hotchkiss' Brass Blanks.... dis 40 %
Hotchkiss' Copper and Tinned.... dis 40 %
Hotchkiss' Padlock and Cabinet.... dis 35 %
Ratchet Bed Keys.... ₱ doz $4.00, dis 15 %

Knife Sharpeners.

Parkin's Applewood Handles.... ₱ doz $6.00, dis 40 %
Parkin's Rosewood or Cocobolo... ₱ doz $9.00, dis 40 %

Knives.

Wilson's Butcher Knives.... dis 20 @ 25 %
Ames' Butcher Knives.... dis 25 %
Nichols' Butcher Knives.... dis 40&1 %
Ames' Shoe Knives.... dis 20@25 %
Ames' Bread Knives.... ₱ doz $1.80, dis 15 @ 20 %
Moran's Shoe and Bread Knives.... dis 20 %
Hay and Straw.... See Hay Knives
Table and Pocket.... See Cutlery

Knobs.

Door Mineral.... 65@68,
Door Por. Jap'd.... 75@78¢
Door Por. Por. Nickel.... $2.00 @ 2.25
Door Por. Plated, Nickel.... $2.00 @ 2.25
Drawer, Porcelain.... dis 55&10&10@5. &10&10 %
Hemacite Door Knobs, new list.... dis 40&10&50 %
Yale & Towne Wood Knobs, list Dec., 1885.... d's 40 %
Furniture Plain.... 75¢ gross inch. dis 10 %
Furniture, Wood Screws.... dis 25&10 %
Base, Rubber Tip.... dis 70&10&5 %
Picture, Judd's.... dis 60&10&10 @ 70 %
Picture, Sargent's.... dis 66⅔&10 %
Picture, Hemacite.... dis 35&5 %
Shutter, Porcelain.... dis 65&10 %
Carriage, Japanned.... ₱ gross 80¢, dis 60&10 %

Ladies.

Melting, Sargent's.... dis 55&10%
Melting, Reading.... dis 35&10%
Melting, Monroe's Patent.... ₱ doz. $4.00, dis 40%
Melting, P. S. & W.... dis 35&10 @ 40%
Melting, Warner's.... dis 30%

Lawn Mowers.

Standard List.... dis 50&10 %
Enterprise.... dis 60&10 %

Lanterns.

Tubular, Plain with Guards.... ₱ doz $4 00 @ $4.25
Tubular, Lift Wire, with Guards... ₱ doz $4.50 @ $4.75
Tubular, Square Plain with Guards, ₱ doz $4.00 @ $4.25
Tubular, Sq Lift Wire, with Guards, ₱ doz $4.25 @ $4.50
Without Guards, 25¢ ₱ dozen less.
Police, small, $6.00; Med. $7.25; Large, $9.75. dis 20@25¢

Lemon Squeezers.

Porcelain Lined, No. 1.... ₱ doz. $6.00, dis 25&30 %
Wood, No. 2.... ₱ doz. $3.00, dis 35 %
Wood, Common.... ₱ doz $1.70 @ 1.75
Dunlap's Improved.... ₱ doz. $3.75, dis 20 ¢
Jammis.... No. 1, $5; 2, $9; 12, $18 ₱ dos. dis 25&10 ¢
Jennings' "Star".... ₱ doz $2.50
The "Boss".... ₱ doz $2.50
Dean's.... Nos. 1, ₱ doz $6.50; 2, $3.35; 3, $1.90
Little Giant.... dis 50 @ 50&5 %
King.... dis 40&5 %

Lines.

Cotton and Linen Fish, Draper's.... dis 50 %
Draper's Chalk.... dis 60 %
Draper's Mason's Linen, 84 ft., No. 1, $1.25; No. 2, $1.75; No. 3, $2.25; No. 4, $2.75; No. 5, $3.25.. dis 25 %
Cotton Chalk.... dis 55 %
Samson, Cotton, No. 4, $2; No. 4½, $2.50.... dis 10 %
Silver Lake, Braided, Nos. 0, $6.00 No. 1, $6.50; No. 2, $7.00; No. 3, $7.50 ₱ gross.... dis 25 %
Masons' Linen, No. 3½, $1.50; No. 4, $2; No. 4½, $2.50
Masons' Colored Cotton.... dis 45
Wire Clothes, No. 18, $3.60, No 19, $3.00; No. 20, $2.50.
Ventilator Cord, Samson Braided, White or Drab Cotton.... $7.50 ₱ doz. dis 20%

Locks, Padlocks, Cabinet Locks, &c.

Door Locks, Latches, &c.—

List, Dec. 30, '86, chgd Feb. 2, '87...dis 50&10 @ 60&5 %
Note.—Lower net prices often made.
Mallory, Wheeler Co., list, July, 1888...dis 50&10&2 %
Sargent & Co. list Feb. 1, 1888.... dis 50&10&2 %
Reading Hardware Co. (list Feb. 2, '88).dis 55@60&10 %
Livingston & Co.... dis 70 %
Perkins' Burglar Proof.... dis 60&25 %
Plate.... dis 33⅓&2 %
P. Many's "Extension Cylinder".... $10.50 ₱ doz
Barnes Mfg. Co.... dis 40 %
Yale Corrugated Key.... dis 33⅓ %
Dietz Flat Key.... dis 30 %
L. & C. Round Key Latches.... dis 30&10 %
L. & C. Flat Key Latches.... dis 33⅓&10 %
Romer's Night Latches.... dis 15 %
Yale new list.... dis 33⅓ %
"Shepardson" or "U. S."..... 33 35 %
"Felter" or "American".... dis 40&10 %
Seed's N. Y. Hasp Lock.... dis 25 %

Cabinet—

Eagle, Gaylord Parker and Corbin,... List March, '84, revised Jan. 1, '85. dis 33⅓&2 %
Deitz, Nos. 36 to 39.... dis 40 %
Deitz, Nos. 51 to 63.... dis 40 &10 %
Dietz, Nos. 86 to 96.... dis 30 %
Stoddard Lock Co.... dis 30 @ 33⅓ %
"Champion" Night Latches.... dis 40 %
Barnes Mfg. Co.... dis 40 %
Eagle and Corbin Trunk.... dis 33⅓&2 %
"Champion" Cabinet and Combination.... dis 33⅓&4
Yale.... dis 33⅓ %
Romer's.... dis 25 %

Padlocks—

List, Dec. 23, '84.... dis 70 @ 70&10 %
Yale Lock Mfg. Co.'s.... dis 33⅓ %
Eagle.... dis 25&2 %
Eureka, Eagle Lock Co.... dis 40&2 %
Romer's, Nos. 0 to 91.... dis 30 %
Romer's Scandinavian, &c, Nos. 100 to 505... dis 15 %
A. E. Dietz.... dis 40 %
"Champion" Padlocks.... dis 40 %
Hotchkiss.... dis 30 %
"Star".... dis 45 %
"Horse Shoe," ₱ doz.. $9.... dis 40 %
Barnes Mfg. Co.... dis 40
Nock's.... dis 30 %
Brown's Patent.... dis 25 %
Scandinavian.... dis90 %
Fraim's Pat. Scandinavian new list (low).... dis 60 %

Lumber Tools.

Ring Peavies, "Blue Line" Finish.... ₱ doz $20.00
Ring Peaves, Common Finish.... ₱ doz $18.00
Steel Socket Peavies.... ₱ doz $21.00
Mall, Iron Socket Peavies.... ₱ doz $19.00
Cant Hooks, "Blue Line" Finish.... ₱ doz $16.00
Cant Hooks, Common Finish.... ₱ doz $14.00
Cant Hooks, Mall, Socket Clasp, "Blue Line" Finish.... ₱ doz $16.00
Cant Hooks, Mall, Socket Clasp, Common Finish.... ₱ doz $14.50
Cant Hooks, Clip Clasp, "Blue Line" Fin. ₱ doz $14.00
Cant Hooks, Clip Clasp, Common Finish.. ₱ doz $12.00
Hand Spikes.... ₱ doz 6 ft., $15.00; 8 ft., $20
Pike Poles, Pike & Hook, 12 ft. 14 ft. 16 ft. 18 ft. 20 ft. ₱ doz.... $11.50 12.50 14.50 17.50 21.50
Pike Poles, Pike only, ₱ doz.... 10.00 11.00 13.00 16.00 20.00
Pike Poles, not ironed, ₱ doz.... 6.00 7.00 9.00 12.00 16.0
Setting Poles, ₱ doz.... 14.00 15.00 17.00
Swamp Hooks.... ₱ doz $13.00
Landing Blocks.... ₱ doz $22.50
Skidding Tongs.... ₱ doz $51.00
Log Binders.... ₱ doz $26.00
Sended Boot Calks, 1 to 5 M, dis 25 %; 5 to 10 M, dis 30 %
Square Steel Boot Calks.... dis 40 %
Chain Rafting Dogs.... ₱ 100 $12.50
Ring Rafting Dogs... ₱ 100, med., $10.00; large, $12.00
Timber Grapples.... ₱ doz $30.00

Lustre.

Four-ounce Bottles.... ₱ doz. $1.75 ₱ gro. $17. 00

Mallets.

Hickory.... dis 20&10@20&10&10 %
Lignumvitæ.... dis 20&10@20&10&10 %
B. & L. Block Co, Hickory and L. V... dis 30 @ 30&10

Match Safes.

Dangerfield's Self-Igniting.... ₱ doz $1.25

Mattocks.—Regular list.... dis 60&10 @ 60&10&5

Meat Cutters

Dixon's—Nos....	1	2	3	4	
₱ dos....	$14.00	17.00	19.00	30.00	—dis 45 %
Woodruff's....		Nos.	100	150	
		₱ doz.	$15.00	18.00	—dis 45

Champion....	Nos.	200	300	400	
	₱ doz.	$22.00	27.00	40.00	—dis 45
Hales' Pattern	Nos. 11	12	13		
	₱ dos...	$27.00	33.00	45.00	dis 70 & 5 %

American.... dis

Nos....	1	2	3	4B		
Each....	$5.00	7.00	10.00	25.00	50.00	60.00

Enterprise.... dis 30

Nos....	10	12	22	32	42
Each....	$3.	3.50	4.00	6 00	15.00

Pennsylvania.....dis 40&10%
Nos. 1 2 3 00
₱ dos. $24.00 28.00 36.00 28.00
Miles' Challenge..Nos. 1 2
₱ doz. $22.00 30.00 40.00—dis 45&45&10 %
Home No. 1.....$26 ₱ doz, dis 55&10 %
Draw Cut..Nos.. 5 2 6 8
Each....$50.00 75.00 80.00 225.00—dis 20 @ 25 %
Beef Shavers, Enterprise Mfg. Co.'s....dis 20&10 @ 30 %
Chadborn's Smoked Beef Cutter.....₱ doz $66.00

Mincing Knives.
A. 2 (2d quality), ₱ gro, 1 blade, $7; 2 blades, $12; 3 blades, $18.....net
Lothrop's.....dis 20&10 %
Smith's, ₱ dos, Single, $2.00; Double, $3....dis 40@45 %
Knapp & Cowles.....dis 50&10@60 %
Buffalo Adjustable.....₱ doz $3.00, dis 25 %

Meinnsser Gates.—Stebbins' Pat..dis 70@70 & 7½ %
Stebbins' Genuine.....dis 60&10&10 %
Stebbins' Tinned Ends.....dis 40&10 %
Chase's Hard Metal.....dis 50&10 %
Bish's.....dis 20 %
Lincoln's Pattern.....dis 66⅔&10 %
Weed's.....dis 20&10 %

Boss Nos.. 1 2 3 4
$7.00 8.00 9.00 10.00, ₱ dos, dis 60&10&10 %

Money Drawers.—₱ doz., $18 @ $20.

Muzzles.—Safety, ₱ doz. $3.....dis 25 %

Nails.....See Trade Report
Wire Nails & Brads, list July 14, 87..dis 70&10 %
Wire Nails, Standard Penny.....₱ keg, $2.50 @ $2.60

Nail Puller.—Curtiss Hammer..₱ dos $9.00 net
Giant, No. 1.....₱ doz $30.00, dis 10 %
Pelican.....₱ doz $9.00, dis 25 %
Boss.....₱ doz $36, dis 30 %

Nail Sets.—Square.....₱ gro., $4.00 @ $4.25
Round.....₱ gro., $3.25
Cannon's Diamond Point.....₱ gro. $12 dis 20 %

Nut Crackers.
Table (Humason & Beckley Mfg. Co.).....dis 40 %
Blake's Pattern.....₱ dos $2.00, dis 10 %
Turner & Seymour Mfg. Co.....dis 50 %

Nuts.
Nuts, all kinds, 5½¢ off list Jan. 1, 1888.
In lots less than 100 ℔, ₱ ℔, add ½¢, 1 ℔ boxes add 1¢ to list.

Okum.
Government.....₱ ℔ 8¢
U. S. Navy.....₱ ℔ 7¢
Navy.....₱ ℔ 6¢ @ 6½¢

Oilers.—Zinc and Tin.....dis 65 @ 65&10 %
Brass and Copper.....dis 50&10@50&10&5 %
Malleable, Hammers' Improved, No 1, $3.60; No. 2, $4.00; No. 3, $4.40 ₱ doz.....dis 10 @ 10&10 %
Malleable, Hammers, Old Pattern, same list....dis 40 %
Prior's Patent or "Paragon" Zinc....dis 60&10&10 %
Prior's Patent or "Paragon" Brass.....dis 50 %
Olmstead's Tin and Zinc.....dis 60 %
Olmstead's Brass and Copper.....dis 50 %
Broughton's Zinc.....dis 60 %
Broughton's Brass.....dis 50 %

Packing, Steam.

Rubber—
Standard.....dis 60&10 @ 60&10&10 %
Extra.....dis 50&10 @ 60 %
N. Y. B. & P. Co., Standard.....dis 50&10&5 %
N. Y. B. & P. Co., Empire.....dis 70 %
N. Y. B. & P. Co., Salamander.....₱ ℔ 65¢, dis 30 %
Jenkins' Standard.....₱ ℔ 80¢, dis 35 %

Miscellaneous—
American Packing.....10¢ @ 11¢ ₱ ℔
Russia Packing.....14¢ ₱ ℔
Italian Packing.....13 @ 14¢ ₱ ℔
Cotton Packing.....15 @ 17¢ ₱ ℔
Jute.....7 @ 8¢ ₱ ℔

Padlocks.—See Locks.

Pails.
Galvanized Iron—

Quarts.	10	12	14
Hill's Light Weight, ₱ dos.	$2.75	3.00	3.25
Hill's Heavy Weight, ₱ doz.	3.00	3.25	3.75
Whiting's.	2.75	3.00	3.25
Sidney Shepard & Co	2.67		3.23
Iron Clad.	2.75	3.00	3.25
Fire Buckets.	2.75	3.25	3.50

Buckets, see Well Buckets

Indurated Fibre Ware—
Star Pails, 12 qt.....₱ doz $4.50
Fire Stable and Milk, 14 qt.....₱ doz $5.50

Pencils Faber's Carpenters.....high list, dis 50 %
Faber's Round Gilt.....₱ gro $5.25 net
Dixon's Lead.....₱ gro $4.50 net
Dixon's Lumber.....₱ gro $9.75 net
Dixon's Carpenters'.....dis 40&10 %

Picks.
Railroad, 5 to 6, $12.00; 6 to 7, $13, dis 60&10@60&10&5 %
Adze Eye, 5 to 6, $12.00; 6 to 7, $13, dis 60&10@60&10&5 %

Picture Nails.
Brass Head, Sargent's list.....dis 50&10&10 %
Brass Head, Combination list.....dis 50&10 %
Porcelain Head, Sargent's list.....dis 50&10&10 %
Porcelain Head, Combination list.....dis 40&10 %
Niles' Patent.....dis 40 %

Pinking Irons.....₱ doz 65¢ net

Pipe, Wrought Iron.—List March 23, 1887.
1¼ and under, Plain.....dis 55 %
1¼ and under, Galvanized.....dis 45 %
1½ and over, Plain.....dis 65 %
1½ and over, Galvanized.....dis 50 %
Boiler Tubes, Iron.....dis 52½ %

Planes and Plane Irons.
Wood Planes—
Molding.....dis 50 @ 50&5 %
Bench, First Quality.....dis 50&10 @ 60 %
Bench, Second Quality.....dis 60&10 %
Bailey's (Stanley R. & L. Co.).....dis 30&10 %
Iron Planes—
Bailey's (Stanley R. & L. Co.)...dis 30&10@30&10&5 %
Miscellaneous Planes Stanley R. & L. Co..dis 20&10 %
Victor Planes Stanley R. & L. Co.)....dis 20& 10 %
Steer's Iron Planes.....dis 35 @ 35&5 %
Meriden Mal. Iron Co.'s.....dis 30&10@30&10&10 %
Davis's Iron Planes.....dis 30&10@30&10&10 %
Birmingham Plane Co.....dis 50@50&5 %
Gage Tool Co.'s Self Setting.....dis 2 %
Chaplin's Iron Planes.....dis 40 @ 40&5 %
Plane Irons—
Plane Irons.....dis 20&10 %
Plane Irons, Butcher's.....$5.00 @ $5.25 to £
Plane Irons, Buck Bros.....dis 30 %
Plane Irons, Auburn Tool Co.'s "Thistle".....dis 40 %
Plane Irons, Middlesex Mfg. Co., "Baldwin" Iron, Single and Cut.....dis 20 @ 25 %
Double.....dis 33⅓ @ 40 %
L. & L. J. White.....dis 25 %

Pliers and Nippers.
Button's Patent.....dis 30&10 @ 40 %
Hall's Pat. Compound Lever Cutting Nippers, No. 2, 6 in., $13.50; No. 4, 7 in., $21.00 ₱ dos dis 20&10@20&10 %
Gumason & Beckley Mfg. Co.....dis 50@50&5 %
Gas Pliers.....dis 60 %
Gas Pliers, Custer's Nickel Plated.....dis 60&5 %
Eureka Pliers and Nippers.....dis 40 %
Russell's Parallel.....dis 25 %
P. S. & W. Cast Steel.....dis 50 %
P. S. & W. Tinners' Cutting Nippers....add 6 % dis 10 %
Carew's Pat. Wire Cutters.....dis 50 %
Morrill's Parallel, per doz., $12.....dis 30&5 %
Cronk's 8 in., $15; 10 in., $21.....dis 40 @ 40&5 %

Plumbs and Levels.
Regular List.....dis 70&10@70&10&10 %
Disston's.....dis 45&10 %
Pocket Levels.....dis 70&10@70&10&10 %
Davis Iron Levels.....dis 30 %
Davis' Inclinometers.....dis 10&10 %

Poppers, Corn.
Round or Square, 1 qt.....₱ gro $12 @ $15
Round or Square, 2 qt.....₱ gro $25 @ $26

Post Hole and Tree Augers and Diggers.
Samson Post Hole Digger.....₱ doz $36.00, dis 25&10 %
Fletcher Post Hole Augers.....₱ doz $36.00, dis 20 %
Eureka Diggers.....₱ doz $16 @ $17
Leed's.....₱ doz $8.00 @ $9.00
Vaughan's Post Hole, Auger, per doz....$13 00 @ $14.00
Kohler's Little Giant.....₱ doz $18.00
Kohler's Hercules.....₱ doz $15.00
Kohler's New Champion.....₱ doz $9.00
Schneidler.....₱ doz $18
Ryan's Post Hole Diggers.....₱ doz $24
Cronk's Post Bars.....doz $60, dis 50&5 @ 50&10 %
Gibb's Post Hole Digger, ₱ doz $30....d's 40 @ 40&10 %

Potato Parers.
White Mountain.....₱ doz $5.00 @ 5.50
Antrim Combination.....₱ doz $8.00
Hoosier.....₱ doz $13.50

Pruning Hooks and Shears.
Disston's Combined Pruning Hook and Saw ₱ doz $18.00.....dis 20&10 %
Disston's Pruning Hook.....₱ doz $12.00, dis 20&10 %
E. S. Lee & Co.'s Prunin Tools.....dis 40 %
Pruning Shears, Henry's Pat...₱ doz $5.75 @ $4.00 net
Henry's Pruning Shears.....₱ doz $4.25 @ $4.50 net
Wheeler, M. & Co.'s Combination...₱ doz $12, dis 20 %
Dunlap's Saw and Chisel.....₱ doz $8.50, dis 30 %
J. Mallinson & Co.....No. 1, $5.25; No. 2, $7.25

Pulleys.—Hot House, Awning, &c.....dis 60&10 %
Japanned Screw.....dis 60&10 %
Brass Screw.....dis 60&10 %
Japanned Side.....dis 66⅔&10 %
Japanned Clothes Line.....dis 60&10 %
Empire Sash Puller.....dis 55 @ 60 %
Moore's Sash, Anti Friction.....dis 50 %

Hay Fork, Solid Eye, $4.00; Swivel, $4.50 } dis 50&10 @ 50&10&5 %
Hay Fork, "Anti-Friction," 5 in. Solid, $5.70...dis 50 %
Hay Fork, "F" Common and Pat. Bushed.....dis 20 %
Hay Fork, Tarbox Pat. Iron.....dis 20 %
Hay Fork, Reed's Self-Lubricating.....dis 60 %
Shade Rack.....dis 45 %
Tackle Blocks.....See Blocks

Pumps.—Cistern, Best Makers.....dis 50 @ 50&10 %
Pitcher Spout, Best Makers...dis 60&10 @ 60&10&10 %
Pitcher Spout, Cheaper Goods..dis 70&5 @ 70&10&5 %

Punches.
Saddlers' or Drive, good quality.....₱ dos 60¢ @ 65¢
Bemis & Call Co.'s Cast Steel Drive.....dis 50&5 %
Bemis & Call Co.'s Springfield Socket.....dis 50&5 %
Spring, good quality.....₱ dos $2.50 @ $2.60
Spring, Leach's Patent.....dis 15 %
Bemis & Call Co.'s Spring and Check.....dis 40 %
Solid Tinners'.....₱ dos $1.44, dis 55 %
Tinners' Hollow Punches.....dis 20&2 %
Rice Hand Punches.....dis 15 %

Rail.
Sliding Door, Wrt. Brass ₱ ℔ 35¢.....dis 15 %
Sliding Door, Bronzed Wrt. Iron.....₱ foot 7¢
Sliding Door Iron, Painted....₱ foot 4¢. dis 20&10&5 %
Barn Door, Light....Inch. ¼ ⅜ ½
Per 100 feet.....$2.50 3.00 4.40—dis 10 %
Net for N. E. Hangers—

	Small.	Med.	Large
Per 100 feet	$2.15	2.70	3.25 net

Terry's Wrought Iron, ₱ foot.....4½¢ @ 5¢
Victor Track Rail, 7¢ ₱ foot.....dis 50&2 %
Carrick Steel Rail, per foot.....4½¢

Rakes.
Cast Steel.....dis 65&5 @ 70 %
Malleable.....dis 70 @ 70&5 %
Gibbs Lawn Rake.....$12, dis 40 %
Canton Lawn Rake.....$9, dis 40 %
Ft. Madison Prize Bow Brace and Peerless..dis 65&5 %
Fort Madison Steel Tooth Lawn Rake, $6.....dis 25 %

Razors.—J. R. Torrey Razor Co.....dis 20%
Wostenholme and Butcher.....$10 to £, dis 10 %

Razor Strops.
Genuine Emerson.....dis 60 @ 60&5 %
Imitation Emerson.....₱ dos $2.00, dis 20&10&5 %
Torrey's.....dis 20 %
Badger's Belt and Combination.....₱ dos $2
Lamont Combination.....₱ dos $4

Rivets and Burrs.
Copper.....dis 70 @ 50&10 %
Iron, list November 17, 1887.....dis 50 @ 50&7½ %

Rivet Sets.....dis 50&2 @ 50&10 %

Rods.—Stair, Brass.....dis 20&2 %
Stair Black Walnut.....₱ dos 40¢

Rollers.
Barn Door, Sargent's list.....dis 60&10&10 %
Acme (Anti-Friction).....dis 55 %
Union Barn Door Roller.....dis 70 %

Rope.—Manufacturers' prices for large lots.
Manila.....½ inch and larger ₱ ℔ 11½¢ net
Manila.....⅜ inch ₱ ℔ 12¢ net
Manila.....¼ and 5-16 inch ₱ ℔ 12½¢ net
Manila Tarred Rope.....₱ ℔ 11¢ net
Manila, Hay Rope.....₱ ℔ 11½¢ net
Sisal.....½ inch and larger ₱ ℔ 9¾¢ net
Sisal.....⅜ inch ₱ ℔ 10¼¢ net
Sisal.....¼ and 5-16 inch ₱ ℔ 10¾¢ net
Sisal, Hay Rope.....₱ ℔ 9¼¢ net
Sisal Tarred Rope.....₱ ℔ 9¼¢ net
Sisal, Medium Lath Yarn.....₱ ℔ 8¾¢ net
Cotton Rope.....₱ ℔ 15 @ 18¢ net
Jute Rope.....₱ ℔ 7¢

Discounts 1¼% for cash in 10 days.

Rules.
Boxwood.....dis 80&10 @ 80&10&10 %
Ivory.....dis 50 @ 50&10 %

Sad Irons.
From 4 to 10, at factory.....₱ 100 ℔ $2.40 @ $2.55
Self Heating.....₱ dos. $9.00 net
Self Heating, Tailors'.....₱ doz. $18.00 net
Gleason's Shield and Toilet.....dis 25 %
Mrs. Pott's Irons.....dis 40@40&5 %
Enterprise Star Irons, new list, July 20, 1882....dis 40 %
Combined Fluter and Sad Iron...₱ doz. $15.00, dis 15 %
Fox Reversible, Self Fluter.....₱ doz., $24.00 net
Chinese Laundry (N. E. Butt Co.).....8½¢, dis 15 %
New England.....8¢, dis 15 %
Mahony's Troy Pol. Irons.....dis 25 %

Sand and Emery Paper and Cloth.
List April 18, 1886.....dis 20@20&5 %
Sibley's Emery and Crocus Cloth.....dis 30 %

Sash Cord.
Common.....₱ ℔, 10¢ @ 11¢
Patent, good quality.....₱ ℔, 13¢ @ 13½¢
White Cotton Braided, fair quality.....₱ ℔ 38¢ @ 39¢
Common Russia Sash.....₱ ℔ 13½¢
Patent " " .....₱ ℔ 15¢
Cable Laid Italian " " .....₱ ℔ 22¢ @ 23¢
India Cable Laid " " .....₱ ℔ 13¢
Silver Lake, A Quality, White.....50¢, dis 10&10&5 %
Silver Lake, A Quality, Drab.....55¢, dis 10&10&5 %
Silver Lake, B Quality, White.....50¢, dis 20&10&5 %
Silver Lake, B Quality, Drab.....55¢, dis 20&10&5 %
Silver Lake, C Quality, White (only).....27¢ @ 28¢
Sylvan Spring, Extra Braided, White.....34¢
Sylvan Spring, Extra Braided, Drab.....32¢
Semper Idem, Braided, White.....30¢
Egyptian, India Hemp, Braided.....25¢
Samson, Braided, White Cotton....50¢ dis 30 @ 30&5 %
Samson, Braided, Drab Cotton....55¢ dis 30 @ 30&5 %
Samson, Braided Italian Hemp....55¢ dis 30 @ 30&5 %
Samson Braided Linen.....80¢ dis 30 @ 30&5 %

Sash Locks.
Clark's No. 1, $10.00; No. 2, $8.00 ₱ gross.....dis 33⅓ %
Ferguson's.....dis 33⅓ %
Morris and Triumph, list Aug. 16, 1886.....dis 60&2 %
Victor.....60&10&2 %
Walker's.....dis 10 %
Attwell Mfg. Co.....dis 25 @ 33⅓ %
Reading.....dis 66⅔&10 @ 66⅔&10&10 %
Hammond's Window Springs.....dis 40 %
Common Sense, Jap'd, Cop'd and Br'zed..₱ gross $4.50
Common Sense, Nickel Plated.....₱ gross $10.00
Universal.....dis 30 %
Kemshall's Gravity.....dis 60 %
Kemshall's Model.....dis 60@60&10 %
Corbin's Daisy, list February 15, 1886.....dis 70 %
Parson's Perfect.....dis 60 @ 60&10 %
Hugunin's New and Improved Adjustable Sash Balances, list Jan. 5, 1887.....dis 25&f &2 %
Hugunin's New Sash Locks, list Jan. 5, '87.dis 25&5&2 %
Stoddard "Practical".....dis 10 %
Ives Patent.....dis 30 %
Lieseche's Nos. 100 & 110 ₱ gro. $8 105. $10..dis 20&10 %
Davis, Bronze, Barnes Mfg. Co.....dis 50 %
Champion Safety, List March 1, 1888....dis 55&5&5 %
Security.....dis 70%

Sash Weights.
Solid Eyes.....₱ ton $52

Sausage Stuffers or Fillers.
Miles' "Challenge".....₱ doz. $20, dis 50&50&5 %
Perry.....₱ doz. No. 1, $15 No 0, $21, dis 50&50&5 %
Draw Cut No. 4.....each, $30.00, dis 20 %
Enterprise Mfg. Co.....dis 20&10 @ 30 %
Silver.....dis 40&10 %

Saws.
Disston's Circular....dis 45@45&5 %
Disston's Cross Cuts..d's 45@45&5 %
Disston's Hand.....dis 25@25&5 %
} Extras some times given by jobbers.
Atkins' Circular.....dis 50 %
Atkins' Silver Steel Diamond X Cuts.....₱ foot 70¢
Atkins' Special Steel Dexter X Cuts.....₱ foot 50¢
Atkins' Special Steel Diamond X Cuts.....₱ foot 30¢
Atkins' Champion and Electric Tooth X Cuts.....₱ foot 27 @ 28¢
Atkins' Hollow Back X Cuts.....₱ foot 18¢
Atkins' Shingle, Mulay, Drag, &c.....dis 45 %
W. M. & C., Hand.....dis 30&5 @ 30&10 %
W. M. & C. Champion X Cuts, Regular ₱ foot, 24¢@26¢
W. M. & C. X Cuts, Thin Back.....₱ foot 27¢@29¢
Peace Circular and Mill.....dis 45&10 %
Peace Hand Panel and Rip....dis 20&10 @ 20&10&10 %
Peace Cross Cuts, Standard.....₱ foot 25¢
Peace Cross Cuts, Thin Back.....₱ foot 27¢@28¢
Richardson's Circular and Mill.....dis 45 @ 45&10 %
Richardson's X-Cuts, No. 1, 30¢; No. 2, 27¢; No. 3, 24¢
Hack Saws—
Griffin's Hack Saws, complete.....dis 40&10 @ 50 %
Griffin's Hack Saw, blades only.....dis 40&10 @ 50 %
Star Hack Saws and Blades.....dis 25 %
Diamond Hack Saws and Blades.....dis 25 %
Eureka and Crescent.....dis 25 %

Saw Frames.
White Vermont.....₱ gro $9 @ $10
Red, Polished, and Varnished....₱ doz $1.50, dis 25 %

Saw Sets.
Stillman's Genuine....₱ dos $5.00 and $7.75, dis 40&5 %
Stillman's Imita..₱ dos $3.25and$5.25, dis40&5@40&10%
Common Lever.....₱ dos $2.00, dis 40&5 %
Morrill's No. 1, $15.00; Nos. 3 & 4, $24....dis 40&10@50%
Leach's.....No. 0, $8.00; No. 1, $15.00, dis 15 @ 20 %
Nash's.....dis 20&10 @ 20&10&10 %
Hammer, Hotchkiss.....$5.50, dis 10 %
Hammer, Bemis & Call Co.'s new Patent....dis 30&5 %
Bemis & Call Co.'s Lever and Spring Hammer..dis 30&5 %
Bemis & Call Co.'s Plate.....dis 10 %
Bemis & Call Co.'s Cross Cut.....dis 12½ %
Aiken's Genuine.....$13.00, dis 50&10 %
Aiken's Imitation.....$7.00, dis 50&5 %
Hart's Patent Lever.....dis 20 %
Disston's, Star, 29, No. 15, $5.50, dis 20&10@20&10&10 %
Atkins Lever.....per doz No. 1, $6.00; No. 2, $9.60
Atkins' Criterion.....per doz $7.50
Croissant (Keller), No. 1, $15.00; No. 2, $24.00, dis 33⅓&10 %

Saw Tools.
Atkins Perfection.....$15.00; Excelsior $6.00 ₱ doz

Scales.
Hatch, Counter, No. 171, good quality.....₱ dos $31
Hatch, Tea, No. 161.....₱ dos $6.75 @ $7.00
Union Platform, Plain.....$2 10 @ 2.20
Union Platform, Striped.....$2.20 @ 2.30
Chatillon's Grocers' Trip Scales.....dis 50 %
Chatillon's Eureka.....dis 25 %
Chatillon's Favorite.....dis 40 %
Family, Turnbull's.....dis 30@30&10

Scale Beams.
Scale Beams, List of Jan. 12, 84..dis 50&10@50&10&5 %
Chatillon's No. 1.....dis 40 %
Chatillon's No. 2.....dis 50 %

Scrapers.
Adjustable Box Scraper (S. R. & L. Co..$6.50, dis 30&10 %
Box, 1 Handle.....₱ dos $4.00, dis 10 %
Box, 2 Handle.....₱ dos $5.00, dis 10 %
Defiance Box and Ship.....dis 20&10 %
Foot.....dis 50&10@60 %
Ship, Common.....₱ dos $3.50 net
Ship, Providence Tool Co.....dis 10 %

Screen Window and Door Frames.
Porter's Pat. Window and Door Frame...dis 33⅓&10 %
Screen Corner Irons, Warner's....dis 33⅓ @ 33⅓&10 %
Stearns' Frames and Corners.....dis 25 @ 25&10 %

Screw Drivers.
Douglas Mfg Co.....dis 20&10&10 %
Disston's.....dis 45&10 %
Disston's Patent Excelsior.....dis 45&10 %
Buck Bros.....dis 30 %
Stanley R. & L. Co.'s Varnished Handles....dis 65&10 %
Stanley R. & L. Co.'s Black Handles.....dis 60&10 %
Sargent & Co.'s No. 1 Forged Blade.....dis 70& 10&10 %
Sargent & Co.'s No. 20.....dis 66⅔&10&10 %
Sargent & Co.'s Nos. 40 & 30, Cast Steel.....dis 60&10 %
Sargent & Co.'s No. 60, Round Blade.....dis 70&10 %
Knapp & Cowles' No. 1.....dis 60&20 @ 70 %
Knapp & Cowles' No. 1 Extra.....dis 60 @ 60&10 %
Knapp & Cowles No. 00 & 4.....dis 50&5 @ 50&10&5 %
Stearns'.....dis 25&10&5 %
Gay & Parsons.....dis 35 %
Champion.....dis 25 %
Clark's Patent.....dis 30 @ 33⅓ %
Crawford's Adjustable.....dis 30 %
Ellrich's Socket and Ratchet.....dis 25 @ 25&10 %
Allard's Spiral, new list.....dis 25 %
Kolb's Common Sense.....₱ doz $6, dis 25&10

Syracuse Screw-Driver Bits.....dis 30 & 30&5 %
Screw Driver Bits.....₩ doz. 50¢ @ 75¢
Screw Driver Bits, Farr's.....₩ gro 6.25
Fray s Hot. Hdle. Sets, No. 3, $12.....dis. 25 @ 25 & 10 %
P. D & Co.'s, all Steel.....dis 50 %

Screws

Wood Screws—List, Brass, Jan 27; Iron, July 1, 1887

Flat Head Iron	dis 70 %	Ex. 10 % often given by jobbers.
Round Head Iron	dis 65 %	
Flat Head Brass	dis 65 %	
Round Head Brass	dis 60 %	
Flat Head Bronze	dis 65 %	
Round Head Bronze	dis 60 %	

Machine—
Flat Head, Iron.....dis 55 %
Round Head, Iron.....dis 50 %

Bench and Hand—
Bench, Iron.....dis 55&10 @ 55&10&10 %
Bench, Wood, Beech.....₩ doz $2.25
Bench, Wood, Hickory.....dis 20&10 %
Hand, Wood.....dis 25&10 @ 25&10&5 %
Lag, Blunt Point.....dis 75 @ 75&10 %
Coach and Lag, Gimlet Point.....dis 75 %
Bed.....dis 25&5 %
Hand Rail, Sargent's.....dis 65&10&10 %
Hand Rail, Humason, Beckley & Co.'s..dis 70&10&75 %
Hand Rail, Am. Screw Co.....dis 75 %
Jack Screws, Millers Falls list.....dis 50 @ 50&5 %
Jack Screws, P. S. & W.....dis 55 %
Jack Screws, Sargent.....dis 60&10 @ 60&10&5 %
Jack Screws, Sterns.....dis 40 @ 40&10 %

Scroll Saws.

Lester, complete, $10.00.....dis 20 %
Rogers, complete, $4.00.....dis 25 %

Scythe Snaths.

.....dis 50&10 %

Shears.

American Cast Iron.....dis 75&10 @ 75&10&5 %
Pruning.....See Pruning Hooks and Shears
Barnard's Lamp Trimmers.....₩ doz $3.75
Tinners'.....dis 20&2 %
Seymour's, List, Dec. 1881.dis 60&10&10@60&10&10&5 %
Heinsch's, List, Dec. 1881.dis 60&10&10@60&10&10&5 %
Heinsch's Tailor's Shears.....dis 33⅓ %
First quality C. S. Trimmers.....dis 80@80&10 %
Second quality C. S. Trimmers.dis 80&10@80&10&10 %
Acme Cast Shears.....dis 10&10 %
Diamond Cast Shears.....dis 10 %
Clipper.....dis 10&10 %
Victor Cast Shears.....dis 75&10@75&10&5 %
Howe Bros. & Hulbert, Solid Forged Steel..dis 40 %
Cleveland Machine Co., Solid Steel Forged..dis 70 %
Clauss Shear Co, Japanned.....dis 70 %
Clauss Shear Co., Nickeled, same list.....dis 60 %

Sheaves

Sliding Door—
M. W. & Co., list July, 1888.....dis 50&10 @ 60&10 %
R. & E., list Dec. 18, 1885.....dis 55&2 %
Corbin's list.....dis 60&10&2 %
Patent Roller.....dis 60&10&2 %
Patent Roller, Hatfield's.....dis 75 %
Russell's Anti-Friction, list Dec. 18, 1885..dis 60&10 %
Moore's Anti-Friction.....dis 60 %

Sliding Shutter—
R. & E. list Dec. 18, 1885.....dis 60&10&2 %
Sargent's list.....dis 60&10 %
Reading list.....dis 60&10&10 %

Ship Tools.

L. & I. J. White.....dis 20&5 %
Albertson Mfg. Co.....dis 25 %

Shoes, Horse, Mule, &c.

Horse—
Burden's, Perkins', Phœnix, at factory.....$4.00

Mule—Add $1 ₩ keg to above prices.

Ox, Wrought—
Ton lots.....₩ ℔ 9¢
1000 ℔ lots.....₩ ℔ 9½¢
500 ℔ lots.....₩ ℔ 10¢

Shot.—*Eastern prices, 2¢ off, cash, 5 days.*)

Drop, ₩ bag, 25 ℔.....$1.50
Drop, ₩ bag, 5 ℔......31
Buck and Chilled, ₩ 25-℔ bag.....$1.55
Buck and Chilled, ₩ 5 ℔ bag.....36

Shovels and Spades.

Ames' Shovels, Spades, &c., list Nov. 1, 1885....dis 20 %
NOTE.—Jobbers frequently give 5 @ 7½ % extra on above.
Griffith's Black Iron.....dis 50&10 %
Griffith's C. S.....dis 60 @ 60&10 %
Griffith's Solid Cast Steel R. R. Goods.....dis 20 %
Old Colony (Sanford Fork & Tool Co).....dis 20 %
St. Louis Shovel Co.....dis 20 @ 20&7½ %
Hussey, Binns & Co.....dis 15 @ 20 %
Hubbard & Co.....dis 20@20&7½ %
Lehigh Mfg. Co.....dis 50&10 %
Payne Pettebone & Son, list January, 1886...dis 30 %
Remington's (Lowman's Patent).....dis 30&10 @ 40 %
Rowland's, Black Iron.....dis 50&10 %
Rowland's Steel.....dis 60&5 @ 60&10 %

Shovels and Tongs.

Iron Head.....dis 60&10@60&10&5 %
Brass Head.....dis 60&10&10 %

Skeins, Thimble.

Western list.....dis 75&5 @ 75&10 %
Columbus Wrt. Steel, list Nov. 1, 1887.....dis 20 %
Coldbrookdale Iron Co.....dis 50&10 %
Utica P. S. T. Skeins.....dis 60 %
Utica Turned and Fitted.....dis 35 %

Sieves.

Buffalo Metallic, S. S. & Co., new list..dis 50&25&10 %
Barler Flour Sifters.....₩ doz $2.00
Smith's Adjustable Sifters.....₩ doz $2.25
Smith's Adjustable Milk Strainer.....₩ doz $2.00
Smith's Adjustable F. & C. Strainer.....₩ doz $1.75

Sieves, Wooden Rim—	Iron.	Plated.
Mesh 18, Nested. ₩ doz	70¢	90¢
Mesh 20, Nested, ₩ doz	80¢	$1.00
Mesh 24, Nested, ₩ doz	$1.00	1.10

Slates.—School, by case.....dis 50&10 %

Snaps, Harness, &c.

Anchor (T. & S. Mfg Co).....dis 65 %
Fitch's Bristol.....dis 50&10 %
Hotchkiss.....dis 10 %
Andrews.....dis 50 %
Sargent's Patent Guarded.....dis 70&10&10 %
German, new list.....dis 40&10 %
Covert.....dis 50&2 %
Covert, New Patent.....dis 50&5&2 %
Covert New R. E.....dis 60&2 %
Covered Spring.....dis 60&10&10 %

Soldering Irons.

Covert's Adjustable, list Jan. 1, 1886.....dis 35&2 %

Spoke Shaves.—Iron.....dis 45 %
Wood.....dis 30 %
Bailey's (Stanley R. & L. Co.).....dis 40&10 %
Stearns'.....dis 20&10 @ 30 %

Spoke Trimmers.

Bonney's.....₩ doz $10.00, dis 50 %
Stearns'.....dis 20&10 %
Ives'.....No. 1, $15.00; No. 2, $12.00 ₩ doz, dis 55&10 %
Douglass'.....₩ doz $9.00, dis 20 %

Spoons and Forks.

Tinned Iron—
Basting, Central Stamping Co.'s list, dis 70@70&10 %
Solid Table and Tea, Central Stamping Company's list.....dis 70@70&10 %
Buffalo S. S. & Co.....dis 33⅓&2 %

Silver-Plated—4 mos. or 5 % cash 30 days.
Meriden Brit. Co., Rogers.....dis 50 %
C. Rogers & Bros.....dis 50 %
Rogers & Bro.....50 %
Reed & Barton.....dis 50 %
Wm. Rogers Mfg. Co.....dis 50&10 @ 50&10&5 %
Simpson, Hall, Miller & Co.....dis 50&10 %
Holmes & Edwards Silver Co..dis 50&10 @ 50&10&5 %
H. & E. Silver Co. Mexican Silver.....dis 50&5 %
H. & E. Silver Co., Durham Silver.....dis 50&5 %
German Silver.....dis 50 @ 50&5 %
German Silver, Hall & Elton.....dis 50 %
Nickel Silver.....dis 50&5@50&10&5 %, cash
Britannia.....dis 60 %
Boardman's Flat Ware.....dis 50&10 %
Boardman's Nickel Silver.....dis 50 %
Boardman's Brit'nia Spoons, case lots..dis 50&10 %

Springs.

Elliptic, Concord, Platform and Half Scroll.....dis 60 @ 60&5 %
Cliff's Solster Springs.....dis 25 %

Squares.

Steel and Iron.....dis 75 @ 75&10&5 %
Nickel Plated.....
Try Square and T Bevels.....dis 60&10&10 @ 70 %
Disston's Try Square and T Bevels.....dis 45&10 %
Winterbottom's Try and Miter.....dis 30&10 %

Staples.

Fence Staples, Galvanized } Same price as Barb Wire.
Fence Staples, Plain } See Trade Report.

Steelyards.

.....dis 40&10@50 %

Stocks and Dies.

Blacksmith's, Waterford Goods...dis 30&5 @ 30&10 %
Lightning Screw Plate.....dis 25 @ 30 %
Reece's New Screw Plates.....dis 33⅓ @ 33⅓&5 %

Stone.

Hindostan No. 1, 3¢; Axe, 84¢; Slips No. 1, 5¢.
Sand Stone.....₩ ℔, 2¢
Washita Stone, Extra.....₩ ℔, 1 @ 22¢
Wasnita Stone, No. 1.....₩ ℔, 15 @ 16¢
Wasnita Stone, No. 2.....₩ ℔, 11 @ 12¢
Washita Slips, No. 1, Extra.....₩ ℔, 40 @ 42¢
Washita Slips, No. 1.....₩ ℔, 30 @ 32¢
Arkansas Stone, No. 1, 4 to 6 in.....₩ ℔, $1.35
Arkansas Stone, No. 1, 6 to 9 in.....₩ ℔, $1.75
Turkey Oil Stone.....4 to 8 in, ₩ ℔, 40¢
Turkey Slips.....₩ ℔, $1.00 @ $1.50
Lake Superior, Chase.....₩ ℔, 16¢
Lake Superior Slips, Chase.....₩ ℔, 31@32¢
Seneca Stone, Red Paper Brand, ₩ ℔.....18 @ 20¢
Seneca Stone, High Rounds, ₩ ℔.....20 @ 25¢
Seneca Stone, Small Whets, ₩ gro.....$24.00

Stove Polish.

Joseph Dixon s.....₩ gro $6.00, dis 10 %
Gem.....₩ gro $4.50, dis 10 %
Gold Medal.....₩ gro $6.00, dis 25 %
"Mirror".....₩ gro $6.00, dis —
Lustro.....₩ gro $4.75 net
Ruby.....₩ gro $3.75 net
Rising Sun, 5 gro. lots.....₩ gro $5.50
Dixon's Plumbago.....₩ ℔ 8¢ net
Boynton's Noon Day, ₩ gro.....$5.00
Parlor Pride Stove Enamel.....₩ gross, $13
Yates' Liquid, 2 3 5 10 gal. cans
₩ gal. $0.90 .80 .70 .60
Yates Standard Paste Polish 10-lb cans, per lb., 15¢
Jet Black.....₩ gro $3.50
Japanese.....₩ gro $3.50
Fireside.....₩ gro $2.50
Diamond O. K Enamel.....₩ gro $19.00

Tacks, Brads, &c.

List, Jan. 2, 1888.

American Iron Carpet Tacks	dis 72½&10&2 %
Steel Carpet Tacks	dis 72½&10&2 %
Swedes Iron Carpet Tacks	dis 72½&10&2 %
American Iron Cut Tacks	dis 70&10&2 %
Swedes Iron Tacks	dis 67½&10&2 %
Swedes Iron Upholsterers' Tacks	dis 67½&10&2 %
Tinned Swedes iron Tacks	dis 67½&10&2 %
Tin'd Sw'des Iron Uphol'ers'Tacks	dis 67½&10&2 %
Gimp and Lace Tacks	dis 67½&10&2 %
Tinned Gimp and Lace Tacks	dis 67½&10&2 %
Swedes Iron Trimmers' Tacks	dis 67½&10&2 %
Swedes Iron Miners' Tacks	dis 67½&10&2 %
Swedes Iron Bill Posters' or Railroad Tacks	dis 67½&10&2 %
Swedes Steel Tacks, all kinds (Swedes Iron price list)	dis 67½&10&2 %
Copper tacks	dis 72½&10&2 %
Copper Finishing Trunk and Clout Nails	dis 67½&10&2 %
Finishing Nails	dis 60&10&2 %
Trunk and Clout Nails	dis 60&10&2 %
Tinned Trunk and Clout Nails	dis 60&10&2 %
Basket Nails	dis 60&10&2 %
Common and Patent Brads	dis 60&10&2 %
Hungarian Nails	dis 60&10&2 %
Chair Nails	dis 60&10&2 %
Zinc Glaziers' Points	dis 45&10&2 %
Cigar Box Nails	dis 45&10&2 %
Picture-Frame Points	dis 45&10&2 %
Looking-Glass Tacks	dis 45&10&2 %
Leathered Carpet Tacks	dis 45&10&2 %
Brush Tacks	dis 45&10&2 %

Extra 10@10&5 % generally given.

Shoe Finders'.....List Jan. 2, 1888. dis 10 @ 10&5 %
Lining and Saddle Nails, List Jan. 1, 1886:

Silvered	dis 30&10&10 %
Japanned	dis 20&10&10 %
Double-pointed Tacks	dis 85 %
Wire Carpet Nails	dis 50&10 %
Wire Brads and Nails	See Nails, Wire
Steel Wire Brads, R. & E. Mfg. Co.'s list	dis 50&10 %

Tap Borers.—Common and Ratchet Drives' Tap Borers.....dis 33⅓&5 %
Enterprise Mfg. Co.....dis 20&10 @ 30 %
Clark's.....dis 33⅓ @ 35 %

Tapes, Measuring.—American.....dis 25&10 %
Spring.....dis 40 %
Chesterman's.....Regular list dis 25 @ 30 %

Thermometers.—Tin Case.....dis 80 @ 80&10 %

Thimble Skeins.—See Skeins.

Ties, Bale.

Steel Wire, Standard list.....dis 50&10&5 %

Tinners' Shears, &c.

Shears and Snips (P. S. & W.).....dis 20 @ 25
Punches—See Punches.
Snips, J. Mallinson & Co.....dis 33⅓

Tinware.

Stamped, Japanned & Pieced, list Jan. 20, 1[illegible].....dis 70&10 @ 70&10&5 %

Tire Benders, Upsetters, &c.

Stoddard's Lightning Tire Upsetters.....dis 15 %
Detroit Perfected Tire Bender.....dis 15 %

Tobacco Cutters.

Enterprise Mfg. Co. (Champion).....dis 20&10 @ 30 %
Wood Bottom.....₩ doz $5.00 @ $5.25
All Iron.....₩ doz $4.25
Nashua Lock Co.'s.....₩ doz $18.00, dis 50 @ 55 %
Wilson's.....dis 55 %
Clipper (Sargent & Co.).....₩ doz $24, dis 50&10&10 %
Acme.....₩ doz $20.00, dis 40 %

Transom Lifters

Wollensak's Patent Iron Bronzed.....dis 50 %
Reiher's Bronzed Iron Rods list Jan. 1, 1887.dis 50&2 %
Reiher's Real Bronze or Nickel Plate, list Jan. 1, 1887.....dis 50&2 %
Excelsior.....dis 50&10&2 %
Shaw's.....dis 50&10
Payson's Universal.....dis 40 @ 40&10 %
Crown and Star.....dis 50 %

Traps.

Game—
Newhouse.....dis 35 @ 40&5 %
Oneida, Pattern.....dis 70 @ 70&5 %
Game, Blake's Patent.....dis 40@40&5 %

Mouse and Rat—
Mouse, Wood Choker.....₩ doz holes, 11@12¢
Mouse, Round Wire.....₩ doz $1.50, dis 10 %
Mouse, Cage, Wire.....₩ doz $2.50, dis 10 %
Mouse, Catch-'em-alive.....₩ doz $2.50, dis 15 %
Mouse, "Bonanza".....₩ gross $10 net
Mouse, Delusion.....₩ gross $18.00, dis 15 %
Rat, "Decoy".....₩ gross $10.00, dis 10 %
Ideal.....₩ gross $10
Cyclone.....₩ gross $5.25
Hotchkiss Metallic Mouse, 5-hole traps...₩ doz 90¢
In full cases.....₩ doz 75¢

Trowels

Lothrop's Brick and Plastering.....dis 2[illegible] %
Reed's Brick and Plastering.....dis 15 %
Disston's Brick and Plastering.....dis 25 @ 25&10 %
Peace's Plastering.....dis 25 %
Clement & Maynard's.....dis 20 %
Rose's Brick.....dis 15 @ 20 %
Brade's Brick.....dis 25 %
Worrall's Brick and Plastering.....dis 2[illegible] %
Garden.....dis 70 %

Trifers.—Butter and Cheese.....dis 25 %

Trucks, Warehouse, &c.

B. & L. Block Co.'s list, 1882.....dis 40 %

Tubes, Boiler.—See Pipe

Twine.

	BC.	B.
No. 9, Flax Twine, ¼ and ⅛ ℔ Balls	22¢	30¢
No. 12, " " ¼ and ⅛ "	21¢	29¢
No. 18, " " ¼ and ⅛ "	18¢	28¢
No. 24, " " ¼ and ⅛ "	18¢	28¢
No. 36, " " ¼ and ⅛ "	16¢	27¢
No. 264, Mattrass, ¼ and ⅛ "	48 @ 50¢	
Chalk Line, Cotton, ¼ ℔ Balls	.25¢	
Mason Line, Linen, ⅛ "	.55¢	
2-Ply Hemp, ¼ and ⅛ ℔ Balls (Spring Twine)	.11½¢	
3-Ply Hemp, 1 ℔ Balls	12 @ 12½¢	
3-Ply Hemp, 1½ ℔ Balls	11 @ 11½¢	
Cotton Wrapping, 5 Balls to ℔	15¢ @ 16¢	
2, 3, 4 and 5 Ply Jute, ¼ ℔ Balls	10¢	
Wool	6½¢ @ 7½¢	
Paper	13¢ @ 14¢	
Cotton Mops—6, 9, 12 and 15 ℔ to doz	18¢	

Vises.

Solid Box.....dis 60 @ 60&5 %

Parallel—
Fisher & Norris Double Screw.....dis 15&10 %
Stephens'.....dis 25 @ 30 %
Parker's.....dis 20 @ 25 %
Wilson's.....dis 55 %
Howard's.....dis 40 %
Bonney's.....dis 40&10 %
Millers Falls.....dis 40 @ 40&10 %
Trenton.....dis 40@40 40&10 %
Merrill's.....dis 15&20 %
Sargent's.....dis 60&10&10 %
Backus and Union.....dis 40 %
Double Screw Leg.....dis 15&10 %
Prentiss.....dis 20&5 @ 25 %
Simpson's Adjustable.....dis 40 %

Saw Filers—
Bonney's, Nos. 2 & 3.....₩ doz $15.00 dis 40&10 %
Stearn's.....dis 33⅓&10 @ 33⅓&10&10 %
Stearn's Silent Saw Vises.....dis 33⅓ @ 35 %
Sargent's.....dis 60@10&10 %
Hopkins'.....₩ doz $17.50 dis 10 %
Reading.....dis 40&10 %
Wentworth.....dis 20&10 %
Combination Hand Vise.....₩ gro, $42.00
Cowell Hand Vises.....dis 20 %
Bauer's Pipe Vises.....dis 10 %

Wagon Boxes.

Per lb.....2½¢

Wagon Jacks.

Daisy.....₩ doz $4.00, dis 25 %

Washer Cutters.

Smith's Patent.....₩ doz $12.00, dis 40&10&10 %
Johnson's.....₩ doz $11.00, dis 33⅓ %
Penny's.....₩ doz Pol. $14; Jap'd, $16...dis 55 %
Appleton's.....₩ doz $16.00, dis 60&10 %
Bonney's.....dis 30&10 %

Washers.

Size	¼	5-16	⅜	½	⅝	¾	1
Washers	7	5⅛	4⅛	3¼	2½	3¼	3¼

In lots less than 200 ℔, ₩ ℔, add ½¢, 5-℔ boxes 1¢ to list

Wedges.—Iron.....₩ ℔ 3½¢
Steel.....₩ ℔ 4¢

Well Buckets, Galvanized.

Bill's.....₩ doz., 12 qt., $4.25; 14 qt., $5.25
Iron Clad.....₩ doz., 14 qt., $4.25 @ $4.50
Whiting's Flat Iron Band.....₩ doz $4.25 @ $4.50
Whiting's Wired Top.....₩ doz $4.00 @ $4.25

Well Wheels—8 in., $2.25; 10 in., $2.70; 12 in., $3.2[illegible]

Wire.

Iron—
Market, Br. & Ann., Nos. 0 to 18.....dis 75@75&5 %
Market, Copper-ed Nos. 0 to 18.....dis 70@70&10 %
Market, Galvanized, Nos. 0 to 18.....dis 65&10 %
Market Tin'd. Tinned list Nos. 0 to 18.....dis 67½@67½&5 %
Stone Br. & Ann'd. Nos. 16 to 18°.....dis 72½&5@75 %
Stone, Bright & Ann'd, Nos. 19 to 26..dis 75&5@75&10 %
Stone, Br. & Ann'd, Nos. 27 to 36...dis 75&10&5@80 %
Stone, Tin'd. Tin'd list, Nos. 18 to 36..dis 70&10@75 %
Tinned Broom Wire, Nos. 18 to 24.....dis 72½@75 %
Galvanized Fence.....dis 65@65&5 %
Annealed Fence, Nos. 8 & 9.....dis 75@75&5 %
Annealed Grape, Nos. 10 to 14.....dis 75@75&5 %
Brass, list, Jan. 18, '84.....dis 15 @ 20 %
Copper, list Jan 18, 1884.....dis 20 @ 25 %
Barb Fence.....See Trade Report
Wire on Spools.....dis 65 %
Malin's Steel and Tinned Wire on Spools.....dis 40 %
Malin's Brass and Copper Wire on Spools.....dis 30 %
Cast Steel Wire.....dis 50 %
Stubs' Steel Wire.....$5.00 to 4, dis 90 %
Steel Music Wire, Nos. 12 to 30.....55¢ ₩ ℔
Picture Wire.....dis 60&10 %
Barb Wire Safety Guards.....₩ 1000 $9.00, dis 22 %
Wire Clothes Lines.—See Lines.

Wire Cloth, Netting, &c.

Painted Screen Cloth, No. 34, ₩ 100 sq. ft.....$1.90
Painted Screen Cloth, No 33, ₩ 100 sq. ft.....$2.00
Galvanized Wire Netting.....dis 70&10 @ 75 %

Wire Goods.—See Bright Wire Goods.

Wire Rope.—List May 1, 1886.....dis 33⅓ %

Wrenches.—American Adjustable.....dis 40 %
Baxter's Adjustable "S".....dis 40 & 0 @ 50 %
Baxter's Diagonal.....dis 40&10 @ 50 %
Coes' Genuine.....dis 50&5
Coes' "Mechanics'".....dis 55&10&25 %
Girard Standard.....dis 70&10 %
Lamson & Sessions' Engineers'.....dis 60&10 %
Lamson & Sessions' Standard.....dis 70&10 %
Coes Pattern, Wrought.....
Girard Agricultural.....
Lamson & Sessions' Agricultural.....dis 30 @ 80&5 %
Sterling Wrought.....
Bemis & Call's Patent Combination.....dis 35 %
Bem's & Call's Merrick's Pattern.....dis 35 %
Bemis & Call's Brigg's Patt'n.....dis 25 %
Bemis & Call's Cylinder or Gas Pipe.....dis 40&5 %
Reinis & Call's No. 3 Pipe.....dis 35&5 %
Aiken's Pocket (Bright).....$6.00, dis 50&10 %
The Favorite Pocket (Bright).....₩ doz $4.00, dis 40 %
Webster's Patent Combination.....dis 25 %
Boardman's.....dis 2[illegible] @ 25 %
Always Ready.....dis 25&5 %
Alligator.....dis 50 %
Donohue's Engineer.....dis 25 %
Acme, Bright.....dis 60&3 %
Acme, Nickeled.....dis 10&3 %
Walker's.....dis 55&3 %
Diamond.....dis 40 %
Diamond Patent Steel.....dis 40 %

Wringers, Clothes.

List Jan. 10, 1888, $2.50 off.

Wrought Goods.

Staples Hooks &c., is Jan. 12, '87.dis 80&20@50&25

CURRENT METAL PRICES.

AUGUST 22, 1888.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market reports.

IRON AND STEEL.

Bar Iron from Store.

Common Iron :

¾ to 2 in. round and square.. 1 to 6 in. x ⅜ to 1 in.....	₩ lb 1.90 @ 2.00¢
Refined Iron :	
¾ to 2 in. round and square.. 1 to 4 in. x ⅜ to 1½ in..... 4½ to 6 in. x ⅜ to 1 in.....	₩ lb 2.10 @ 2.25¢
1 to 6 in. x ¼ and 5-16	₩ lb 2.30 @ 2.45¢
Rods—⅜ and 11-16 round and sq.	₩ lb 2.30 @ 2.35¢
Bands—1 to 6 x 3-16 to No. 12	₩ lb 2.30 @ 2.45¢
"Burden Best" Iron, base price.	₩ lb 3.00 @ ....¢
Burden's "H. B. & S." Iron, base price	₩ lb 2 80 @ ....¢
"Ulster"	lb lb 3.10 @ ....¢
Norway Rods	4.00 @ 5.00¢

Merchant Steel from Store.

Per pound.

Open-Hearth and Bessemer Machinery, Toe Calk, Tire and Sleigh Shoe, base price in small lots	2¾¢ @ 3¢
Best Cast Steel, base price in small lots	8¾¢ @ 9¢
Best Cast Steel Machinery, base price in small lots	5½¢ @ 6¢

For Classification and Extras adopted by the Merchant Steel Association of the United States, June 1, 1888, see *The Iron Age*, June 21, 1888.

Sheet Iron from Store.

	Common American.		R. G.	Cleaned.
10 to 16	₩ lb 2.75	@ 2.80¢	3.25	@ ....¢
17 to 20	₩ lb 2.85	@ 3 00¢	3.25	@ 3.50 ¢
21 to 24	₩ lb 3.00	@ 3.10¢	3.50	@ ....¢
25 and 26	₩ lb 3 20	@	3.50	@ ....¢
27	₩ lb 3.35	@ 3.37½¢	3.75	@ ....¢
28	₩ lb 3.50	@ ....¢	4.00	@ ....¢

	B. B.	2d qual.
Galv'd, 14 to 20,	₩ lb. 4.50 @	4.38 @ ....¢
Galv'd, 21 to 24,	₩ lb, 4.87½ @	4.75 @ ....¢
Galv'd, 25 to 26,	₩ lb, 5 25 @	5.12 @ ....¢
Galv'd, 27	₩ lb, 5.62½ @	5.48 @ ....¢
Galv'd, 28	₩ lb, 6.00 @	5.85 @ ....¢
Patent Planished	₩ lb A 10¢	B, 9¢
Russia	₩ lb 9½¢ @ 10¢	
American Cold Rolled B. B.	₩ lb 5¢ @ 7¢	

English Steel from Store.

Best Cast	₩ lb 15 ¢
Extra Cast	₩ lb 16½ @ 17 ¢
Swaged, Cast	₩ lb 16 ¢
Best Double Shear	₩ lb 15 ¢
Blister, 1st quality	₩ lb 12½¢
German Steel, Best	₩ lb 10 ¢
2d quality	₩ lb 9 ¢
3d quality	₩ lb 8 ¢
Sheet Cast Steel, 1st quality	₩ lb 15 ¢
2d quality	₩ lb 14 ¢
3d quality	₩ lb 12½¢

METALS.

Tin.

	Per lb
Banca, Pigs	24¢
Straits, Pigs	24¢
English, Pigs	24¢
Straits in Bars	25¢

Tin Plates.

Charcoal Plates.—Bright.

		Per box.
Melyn Grade	IC 10 x 14	$5.75 @ $6 00
" "	IC, 12 x 18	6.00 @ 6.25
" "	IC, 14 x 20	5.75 @ 6.00
" "	IC, 20 x 28	12.25 @ 12.50
" "	IX, 10 x 14	7.25 @ 7.50
" "	IX, 12 x 12	7.50 @ 7.75
" "	IX, 14 x 20	7 25 @ 7.50
" "	IX, 20 x 28	15.25 @ 15 50
" "	DC, 12½ x 17	5.50 @ 5.75
" "	DX, 12½ x 17	7.00 @ 7.25
Calland Grade	IC, 10 x 14	$6.00
" "	IC, 12 x 12	6 25
" "	IC, 14 x 20	6.00
" "	IX, 10 x 14	7.50
" "	IX, 12 x 12	7.75
" "	IX, 14 x 20	7.50
Allaway Grade	IC, 10 x 14	$5.25 @ ..
" "	IC, 12 x 12	5.50 @ ....
" "	IC, 14 x 20	5.25 @ ....
" "	IC, 20 x 28	10.75 @ ....
" "	IX, 10 x 14	6.25 @ ....
" "	IX, 12 x 12	6 50 @ ....
" "	IX, 14 x 20	6.25 @ ....
" "	IX, 20 x 28	12.50
" "	DC, 12½ x 17	5.00 @ ....
" "	DX, 12½ x 17	6.00 @ ....

Coke Plates —Bright.

Steel Coke.—IC, 10 x 14, 14 x 20		$4.80 @ ....
	10 x 20	7.50 @ 7.65
	20 x 28	10.00 @ 10.15
	IX, 10 x 14, 14 x 20	5.65
BV Grade.—IC, 10 x 14, 14 x 20		4.70 @ ....

Charcoal Plates.—Terne.

Dean Grade.—IC, 14 x 20		$4.62½ @ ....
	20 x 28	9 25 @ ....
	IX, 14 x 20	5.62½ @ ....
	20 x 28	11.37½ @ ....
Abecarne Grade.—IC, 14 x 20		4.50 @ ....
	20 x 28	9.00 @ ....
	IX, 14 x 20	5.50 @ ....
	20 x 28	10.80

Tin Boiler Plates.

IXX, 14 x 26	112 sheets	$12.50 @ $12.75
IXX, 14 x 28	112 sheets	12 75 @
IXX, 14 x 31	112 sheets	14.25 @

Copper.

DUTY: Pig, Bar and Ingot, 4¢; Old Copper, 3¢ ₩ lb. Manufactured (including all articles of which Copper is a component of chief value), 45 % ad valorem.

Ingot.

Lake	@ 17.50¢
"Anchor" Brand	@ 17¢

Sheet and Bolt.

Prices adopted by the Association of Copper Manufacturers of the United States, December 10, 1887, being quotations for all sized lots.

Not wider than	Not longer than	And longer than	Weights per square foot and prices per pound. Over 64 oz.	32 to 64 oz.	16 to 32 oz.	14 to 16 oz.	12 to 14 oz.	10 to 12 oz.	8 to 10 oz.	Less than 8 oz.
30	72		25	25	25	26	27	28	31	33
30		72	25	25	25	26	28	30	34	....
36	96		25	25	25	27	29	33	36	....
36		96	25	25	26	28	30	34	38	....
48	96		25	25	27	29	31	35	....	....
48		96	25	25	23	30	32	36	....	....
60	96		25	25	30	32	37	....	....	....
60		96	25	26	31	....	....	....	....	....
84	96		26	27	..	....	....	....	....	....
84		96	27	28	....	....	....	....	....	....
Over 84 in. wide			28	30	....	....	....	....	....	....

	16 oz.	14 oz.	12 oz.	10 oz.
All Bath Tub Sheets				
Per pound	$0.28	0.30	0.32	0 35

Bolt Copper, ⅜ inch diameter and over, per pound ..... 25¢

Circles, 60 inches in diameter and less, 3 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles, over 60 inches diameter, up to 96 inches diameter, inclusive, 5 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles, over 96 inches diameter, 6 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Segment and Pattern Sheets, 3 cents per pound advance over price of sheets required to cut them from.

Cold or Hard Rolled Copper, 14 ounces per square foot and heavier, 1 cent per pound over the foregoing prices.

Cold or Hard Rolled Copper, lighter than 14 ounces per square foot, 2 cents per pound over the foregoing prices.

Copper Bottoms, Pits and Flats.

Per pound.

14 ounce to square foot and heavier	28¢
12 ounce and up to 14 ounce to square foot	29¢
10 ounce and up to 12 ounce	31¢

Circles less than 8 inches diameter 2 cents per pound additional.

Circles over 13 inches diameter are not classed as Copper Bottoms.

Tinning.

Tinning sheets on one side, 10, 12 and 14 x 48 each	8¢
Tinning sheets on one side, 30 x 60 each	30¢
For tinning boiler sizes, 9 in (sheets 14 in. x 60 in.), each	15¢
For tinning boiler sizes, 8 in. (sheets 14 in. x 56 in.), each	12¢
For tinning boiler sires, 7 in. (sheets 14 in. x 52 in.) each	12¢
Tinning sheets on one side, other sizes, per square foot	2½¢
For tinning both sides double the above prices.	

Planished Copper.

Planished Copper List May 5, 1888 ..... Net

Brass and Copper Tubes.

Seamless Copper.		Seamless Brass.	
⅝ inch ₩ lb	50¢	⅝ inch ₩ lb	47¢
½ " "	44¢	½ " "	41¢
⅜ " "	42¢	⅜ " "	39¢
¾ " "	40¢	¾ " "	37¢
⅞ " "	39¢	⅞ " "	36¢
1 " "	37¢	1 " "	34¢
1¼ " "	34¢	1¼ " "	31¢

Roll and Sheet Brass.

Discount from list ..... 10 @ 15 %

Spelter.

Duty: Pig, Bars and Plates, $1.50 ₩ 100 lb.

Western Spelter	5½¢
"Bergenport"	8¾¢
"Bertha"	7¾ @ 8¢

Zinc.

Duty: Sheet, 2½¢ ₩ lb.

600 lb casks	6½¢
Per lb	7¢

Lead.

Duty: Pig, $2 ₩ 100 lb. Old Lead, 2¢ ₩ lb. Pipe and Sheets, 3¢ ₩ lb.

American	4¾ @ 5¢
Newark	4¾ @ 5¢
Bar	@ 5½¢
Pipe, subject to trade discount	6½¢
Tin-Lined Pipe, subject to trade discount	15¢
Block Tin Pipes, subject to trade discount	40¢
Sheet, subject to trade discount	7¼¢

Solder.

½ @ ½ (Guaranteed) ..... 15¢

Extra Wiping ..... 13¢

The prices of the many other qualities of Solder in the market indicated by private brands vary according to composition.

Antimony.

Cookson	₩ lb 13¾ @ 14¢
Hallett's	" 11¾¢

Plumbers' Brass Work.

	Discount per cent.
Ground Bibbs and Stops	55&10&2
Ground Stops, Hydrant Cocks, &c	55&10&2
Corporation Cocks	55&10&2
Corporation Cocks, "Mueller" Pattern, from Western list	55&10&2
Ground Basin and Shampooing Cocks	50&10&2
Compression Basin Cocks	50&10&2
Compression Basin and Sink Cocks	50&10&2
Compression Pantry Cocks	50&10&2
Compression Double Basin and Shampooing Cocks	50&10&2
Compression Bath Cocks	50&10&2
Compression Bibbs, Urinal Cocks, Sill Cocks, Stops, Hopper Cocks, Hydrant Cocks and Ball Cocks	50&10&2
Basin Plugs and Basin Grates	55&10&2
Bath and Wash Tray Plugs	55&10&2
Bath Wastes and Washers, Bath and Basin Valves, Sewer and Vacuum Valves, Cistern Valves, Pump Valves and Strainers, Ship Closet Valves and Suction Baskets	55&10&2
Basin Clamps, Basin Joints and Strainers	55&10&2
Boiler Couplings, Ground Face, per set $1.25	dis 10
Boiler Couplings, Plain Face, per set $1.20	dis 10
Water Back Valve and Plain Couplings, Soldering Nipples and Unions	55&10&2
Union Joints	60&10&2
Hydrant Nozzles, Handles and Guides, Sockets and Clamps, Street Washer Screws and Guides	55&10&2
Hose Goods	55&10&2

Steam and Gas Fitters' Brass and Iron Work.

	Discount per cent.
Brass Globe Valves	60&10&2
Finished Brass Globe Valves, with Finished Brass Wheels	40&10&2
Brass Globe Valves, with Patent Wood Wheels	60&10&2
Brass Globe Angle and Corner Valves	60&10&2
Brass Radiator Angle Valves	60&10&2
Brass Radiator Angle Valves, Frink's Patent	60&10&2
Brass Cross and Check Valves	60&10&2
Brass Check Valves	60&10&2
Brass Hose Valves	60&10&2
Brass and Iron Frink Valves	60&10&2
Brass Safety Valves	60&10&2
Brass Vacuum Valves	50&10&2
Brass Whistle Valves	60&10&2
Brass Balance, Back Pressure and Foot Valves	50&10&2
Brass Butterfly and Throttle Valves	50&10&2
Brass Pump Valves	50&10&2
Brass Steam Cocks	57½&10&2
Brass Service, Meter and Union Meter Cocks	57½&10&2
Brass Whistles, Water Gauges and Oil Cups	60&10&2
Brass Hollow Plug, Tallow and Globe Oil Cups	50&10&2
Brass Lubricators	60&10&2
Brass Air Valves	60&10&2
Brass Air Cocks	60&10&2
Brass Gauge Cocks	55&10&2
Brass Cylinder Cocks and Steam Bibbs	50&10&2
Brass Swing Joints and Expansion Joints	50&10&2
Brass Test Pumps	50&10&2
Brass Steam Fittings, Rough	60&10&2
Brass Steam Fittings, Finished	20&10&2
Brass Union Joints	60&10&2
Brass Soldering Unions and Nipples	55&10&2
Brass Hose Fittings, Fusible and Boiler Plugs	55&10&2
Iron Body Globe, Angle, Cross and Check Valves	65&10&2
Iron Body Safety, Throttle, Back Pressure, Butterfly and Foot Valves	65&10&2
Iron Cocks, all Iron	65&10&2
All Iron Valves	65&10&2

Miscellaneous.

	Discount per cent.
Cast Iron Fittings	70&10
Plugs and Bushings	75&10
Malleable Iron Unions	67½
Malleable Iron Fittings	25

Paints.

Black, Lamp—Coach Painters'	₩ lb 22 @ 24¢
" Ordinary	6¢
Black, Ivory Drop, fair	12 @ 15¢
" " best	23¢
Black Paint, in oil	kegs, 8¢; assorted cans, 11¢
Blue, Prussian, fair to best	40 @ 55¢
" " " in oil	45 @ 55¢
" Chinese dry	70¢
" Ultramarine	18 @ 30¢
Brown, Spanish	1¼¢
" Van Dyke	10 @ 12¢
Dryers, Patent American	ass'd cans, 9¢; kegs, 7¢
Green, Chrome	15 @ 23¢
Green, Chrome in oil	14 @ 18 @ 25¢
Green, Paris	good, 20¢; best, 25¢
Green, Paris in oil	good, 30¢; best, 35¢
Iron Paint, Bright Red	₩ lb 2¼¢
Iron Paint, Brown	₩ lb 1¾¢
Iron Paint, Purple	₩ lb 3¢
Iron Paint, Ground in oil, Bright Red	₩ lb 6½¢
Iron Paint, Ground in oil, Red	₩ lb 5½¢
Iron Paint, Ground in oil, Brown	₩ lb 5½¢
Iron Paint, Ground, Purple	₩ lb 6¢
Litharge	6½¢
Mineral Paints	2 @ 4¢
Orange Mineral	10¢
Red Lead, American	6½¢
Red Venetian (Eng.) dry	$1.65 @ $1.70
Red Venetian in oil	asst'd cans, 11¢; kegs, 8¢
Red Indian Dry	9 @ 12¢
Rose Pink	10 @